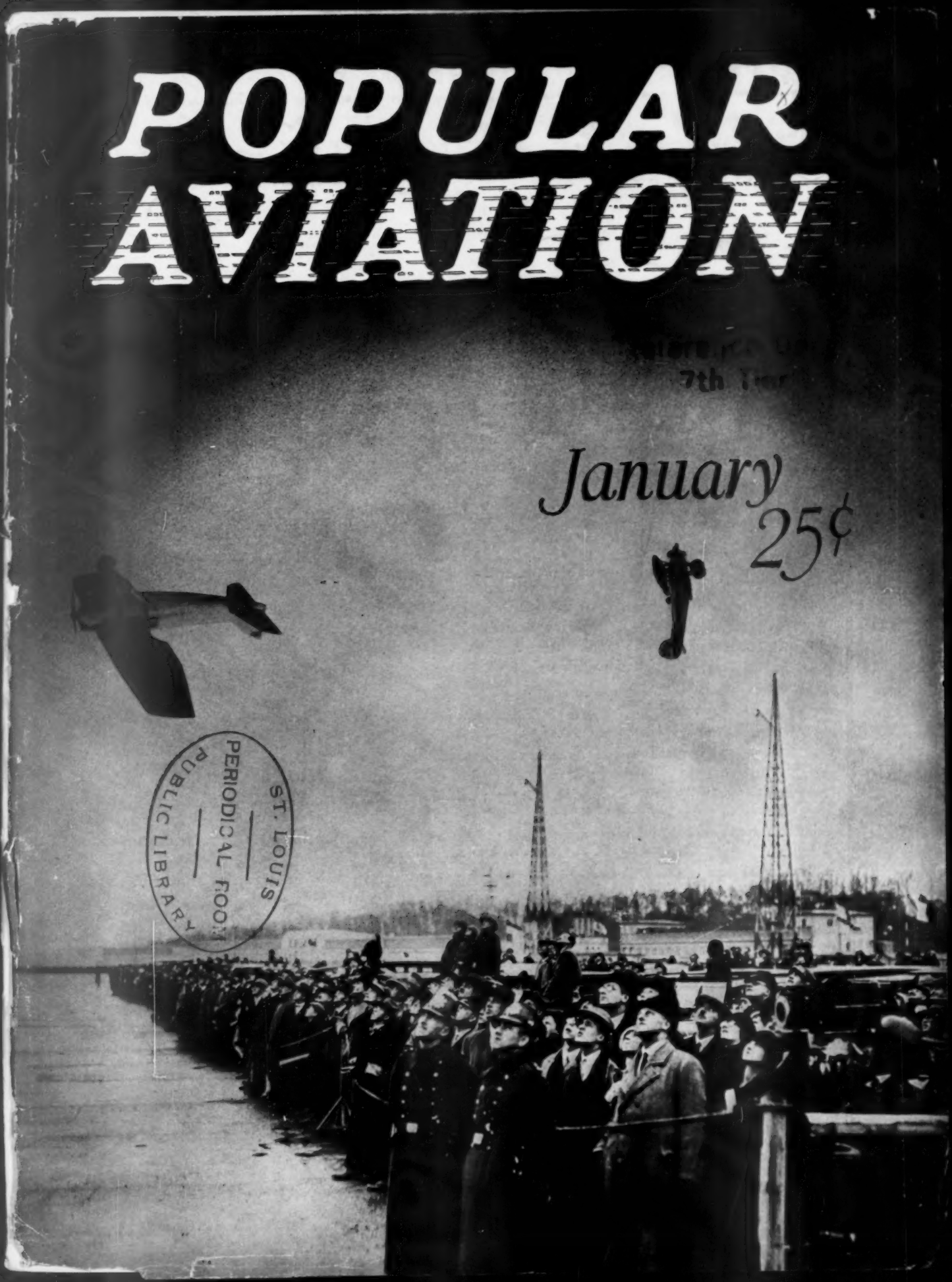
POPULAR AVIATION



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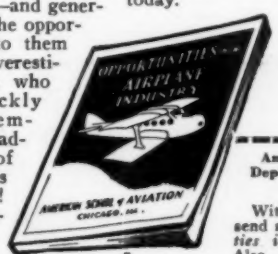

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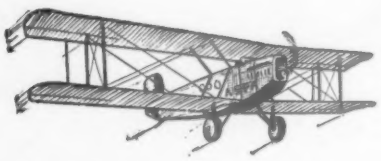

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POPULAR AVIATION

Published Monthly

A magazine for everyone interested in aviation progress and development

Vol. 2 **JANUARY, 1928** **No. 1**

Contents

Aviation's Greatest Year - - - - - - - - - - - - 7
Free Lancing in the Air - - - - - - - - - - - - 10
Ocean Flight Forecasts - - - - - - - - - - - - 16
Caterpillar Club - - - - - - - - - - - - - - 19
Official World and American Records - - - - - - - - 22
Job Wanted - - - - - - - - - - - - - - - 28
Current Comment - - - - - - - - - - - - - - 30
Aviation Insurance - - - - - - - - - - - - - 32
Index of Aircraft - - - - - - - - - - - - - - 35
Absolutely Scientific and All That - - - - - - - - - 37
University of Pennsylvania Club - - - - - - - - - - 39
New Speed Record - - - - - - - - - - - - - 41
Airways Schedule - - - - - - - - - - - - - - 42
Model Construction - - - - - - - - - - - - - 46
Chanute's Models Found - - - - - - - - - - - - 52
Air Police - - - - - - - - - - - - - - - 54
An A B C of Aviation - - - - - - - - - - - - - 55
News of the Airports - - - - - - - - - - - - - 58
Directory - - - - - - - - - - - - - - - - 79
Service Aviation—The Pioneer - - - - - - - - - - - 76
Growth of Air Transportation in 1927 - - - - - - - - 77
Control of Air Transportation - - - - - - - - - - - 81

Published monthly by Popular Aviation Publishing Company, 608 S. Dearborn Street, Chicago, Illinois. Edited by Harley W. Mitchell; C. R. Borkland, Business Manager; Advertising Representative, W. B. Ziff Company, New York and Chicago. Subscriptions, $2.50 per year, single copies 25c. All contributions paid for at regular rates. Entered as second class matter September 16, 1927, at the Post Office at Chicago, Illinois, under the Act. of March 3, 1879.

Worth a Thought

The recent press utterance of Colonel Lindbergh is worth more than a passing thought. Dealing as he did with a condition and not a theory, and having no axes to grind nor any personal considerations to favor, he came out definitely to stress the menace to aviation that exists in the rapid turning out of half-trained flyers.

Successively he pointed out the fact that the pilot plays a major part in the safe operation of aircraft; that men of limited finances must earn as they learn, and do so by taking up passengers, and that present government regulations can not prevent them doing so as long as they confine their operations to their own state.

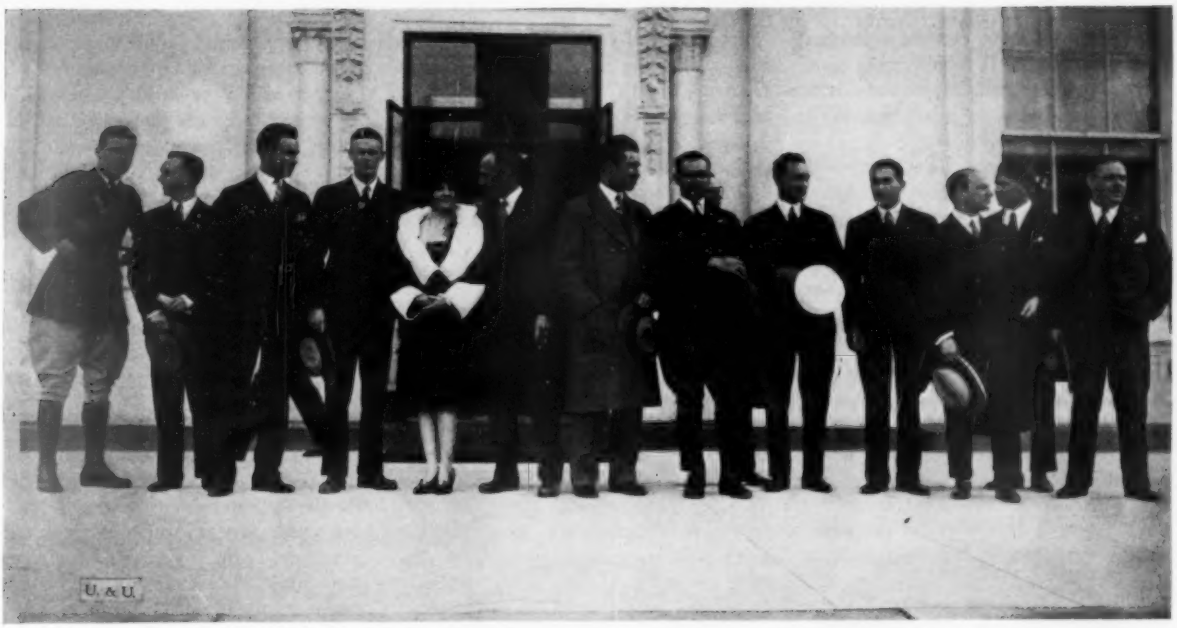
The crux of the matter lies in the last statement. Proper and enforceable regulation should be based on the theory that the federal government has a right and a duty to make and enforce a uniform set of such regulations. We do not wish to see the same chaos in aircraft legislation that exists with regard to the automobile.

Federal regulation, running not only to the construction, inspection and operation of aircraft, but also to instruction in flight, will have one effect that will be for the decided good of the public at large and the prospective student in particular.

The conforming of any school to the government requirements will be an assurance to the student that he will receive exactly the type of course he pays for, offered under conditions and precautions that will make for his safety and progress during training.

This time is probably close at hand and in place of individual investigation will be substituted governmental inspection. Possibly by the time this is read a program covering this action may be formed, from opinions and advices offered at Washington during the conference of those interested in aircraft and the development of aviation.

Until that time, however, we want to assure our readers that as far as it lies within our powers, we investigate to the fullest extent all those who use our columns in order to reach the air minded people of this country.



Maitland, Chamberlin, Goebel, Lindbergh, Elder, Schluter, Bronte, Hegenberger, Byrd, Haldeman, Levine, Balchen and Brock—A galaxy of ocean hoppers.

Aviation's Greatest Year

THE close of 1927 brings to an end what is probably the greatest year aviation has seen in its brief life of less than 25 years. To take only those events which assume importance in the eyes of the public on account of their spectacular quality, from the flight of Lindbergh to Paris down to the almost tragic half-completed flight of Haldeman and Elder, we have had a succession of ocean-crossing trips that have at least kept aviation on the front pages of the newspapers from day to day.

A glance at the photograph heading this article may come somewhat as a surprise to the casual reader when he realizes that each one of this long row has become notable for distance flights, and that for a space during this year the front pages of the papers were occupied by these people to the exclusion of other news.

But this spectacular angle alone is not what has made 1927 aviation's greatest year. The newspaper-fed public soon grows weary of front page sensations, and it seems to be the usual thing for them promptly to forget events and to pass to the next interesting occurences.

Aviation has not suffered in this way. The publicity engendered by Col. Lindbergh has had actual results in making the public air-minded. With the practicality that seems to be one of our characteristics the public has taken to the air as a solution of one of the problems of today—Quicker Transportation.

Probably the Guggenheim Fund for the Promotion of Aeronautics could have done no better thing, from the standpoint of everyone considered, than the planning and carrying out of the Lindbergh Tour. The directors of the Fund took supreme advantage of the combination of a nationally popular figure and a growing national interest in aviation and combined the two for the good of aviation.

However, all of these are mere surface indications of the progress that aviation has made during the past year. The evidence the public has had of aviation's rapid growth might be summed up by briefly mentioning the following:

Lindbergh—New York to Paris.

Chamberlin and Levine—New York to Kottbus, Germany.

Hagenberger and Maitland—San Francisco to Honolulu.

Byrd, Noville, Balchen and Acosta —New York to Ver-sur-Mer.

Smith and Bronte—San Francisco to Hawaii.

Goebel, Davis, Jensen, Schlueter—The Dole Race.

Brock and Schlee — Two-thirds around the world.

Other names deserve being added to this list, as records have been made which have added to the publicity that aviation has received. But any list has its limits.

These flights were possible chiefly because of mechanical improvements made by the industry and were not simply a series of coincidences that centered about the flying season of this year. First of all, motors had reached a point where reliability and gas consumption together made 2,000-mile flights a possibility with success a greater probability than disaster.

Instruments had been improved to a point where night navigation became less a matter of guesswork and "feel." Aerial navigation has become a matter of study along certain definite lines, rather than an experimental science.

Such engines and instruments were

not new to this year, but there is a difference between existence and popular acceptance. Probably this condition is best illustrated in the history of radio. Radio, as a laboratory possibility, had been known for years before the acceptance of radio by the public. When the acceptance came it took the entire industry by storm.

Structurally, there were few improvements in planes during the year past. When one considers that the past has seen so many varied types, it becomes a matter of speculation as to what new structural changes can be made in planes that do not seem to be fathered out of the past. We have had tractors and pushers and combinations of the two; front and rear elevators; monoplanes, sesquiplanes, biplanes, triplanes and multiplanes; planes with box tails and dual tails; in fact the changes have been rung on almost every imaginable type, and some types that possibly had best been never imagined.

The Hubbard Medal which was presented to Colonel Lindbergh November 14 by President Coolidge on behalf of the National Geographic Society.

To go back to the engines—one of the features of the year has been the development, in this country, of aircraft power plants. The industry has been favored, though some say handicapped, by the availability of costly war-surplus engines at a price far below actual value.

The net result of such a condition has been that power plants were available to manufacturers of planes at a fraction of the actual cost of such engines. Prices to the purchaser were adjusted accordingly and the public was favored to the extent of buying planes for a much lower price than would have been possible had the power plants been purchased in the open market under competitive conditions that had some relation to costs. Unquestionably more planes were sold than could have been disposed of at the higher prices that would have been necessary under normal conditions.

But such a situation has its drawbacks. Manufacturers depending on this source for the engines to put in their planes have seen what appears to be the end of this supply of cheap power plants, with apparently no engines available to supplant the present supply. No manufacturers of engines cares to enter a market glutted with engines at a price below cost.

Fortunately for the industry at large, and particularly for the manufacturers of the lower priced sport planes, some engine manufacturers have been foresighted enough to develop engines suitable for aircraft use, and to place them in production so that the exhaustion of our war-surplus of aircraft engines finds us with power plants already in production, tested and with the "bugs" out, so that the forecasted setback of the industry will probably not take place. Besides, American adaptations of successful foreign engines, we have several purely American developments in the engine field available for planes of all price ranges.

Although air mail existed long before the flight of Lindbergh and the rest who so forcibly demonstrated the annihilation of space by aircraft, it is doubtful if many people realized the extremely practical application of air transportation to everyday needs. At any rate, there was an immediate increase, and a tremendous one, in the volume of air mail letters. Business men realized that Chicago was but eight hours away from New York by mail, and that afternoon letters by air mail made practically the same time as night letters by wire.

People have begun to consider distance in matters of hours. One of the results of the publicity aviation has received this year is the common method of calculation of distance—100 miles equals 1 hour. From a nation of travellers, who have been measuring distances of towns by railroad time, we are turning into map calculators who lay a rule between cities and declare that the possible time is in air-hours.

Probably the outstanding event of the year, speaking strictly from the aircraft outlook, was the abandonment by the government of the last publicly operated air mail line. Sufficient comment has been made on this, but it might be well to emphasize again that this method of developing private enterprise has always proved to be more than successful.

Our contract air mail companies may never become rich and powerful through the carrying of the mails, but they are at least free to work out their own salvation and to utilize the high type of professional and business intelligence which has been drawn to them. They have already organized the business of express carrying with marked success, particularly, along certain commercial lines.

Bankers have now realized that air transport of commercial paper means a substantial saving in interest charges. Important documents can be sent across the country and returned with a speed unthought of a few years ago. Flowers and ripe fruits, jewelry and automobile parts are sent by air with particular advantage.

With air transport available through the medium of a network of regularly operated lines running on schedule, it is not out of the way that many firms began to consider the more intimate adaptation of air service to their own business problems.

The particular problem of the day in business is what is commonly known as "Hand-to-mouth" buying.

It involves the maintenance of short inventories on the part of retailers and wholesalers, and has assumed proportions that has made it the subject of deep investigation by the manufacturers affected. Air transport seems to offer to many of them a way out of the perplexing problem afforded by this development.

Delivery service and the satisfaction of customers' demands must be maintained with speed and the airplane offers this solution in a logical manner. Already many companies have found that freight planes pay them from both the publicity and the service standpoint.

Other companies, whose properties and sales territories are widely separated, have found the airplane an economical means of transportation when high salaried officials make inspection trips. Fewer days are lost in travelling and inspection tours have become less wearisome.

Another development of the year, in which we are behind our neighbors across the sea, is the rise of the Aero Clubs. Flying has attracted thousands of younger men and as a consequence various schools have been overwhelmed with applicants for training courses and have been forced to increase their training facilities to keep pace with the demand for instruction. The increase in school facilities has not been sufficient to take care of the graduate student who is desirous of putting in sufficient hours of flight in order to obtain a license.

The increase in interest has, of itself, made the problem of solo hours a greater one, as in many places all available ships have been pressed into service for training and are not at the disposal of men seeking solo hours.

Again, the relatively high price of ships and instruction, when considered from the standpoint of the individual, fades into nothing when considered from the group standpoint. Ten, fifteen, or fifty men can own a ship together when the ownership by a single individual might be an impossibility. There is a great and growing movement toward the formation of clubs which will offer the members training and an opportunity to rent a ship for solo work at cost. This movement is probably doing as much toward making the country air-minded as any other single factor.

Of course, the publicity aviation received so generously during the year has had another effect. Communities have awakened to the necessity of airports. It is one of the encouraging features of the day that this interest is not only widespread but is maturing in intelligent form and with competent direction.

Had a similar movement with relation to our road system and city streets been undertaken at the inception of automobile development, we would not today be faced with the parking problem that worries so many of our cities. Airport construction, with due regard to other forms of transportation, is occupying civic bodies in thousands of communities of this country.

Governmental regulation has been wisely and cautiously directed by the Department of Commerce. The airplane occupies an unusual situation in comparison with other forms of transportation. It is less susceptible to regulation due to the fact that it is not confined to surface travel and may traverse an unusual distance in a few hours, passing over several states.

Twenty-one pursuit planes in the air at one time—a beautiful example of Formation Flying.

It is to be hoped that the various states will pattern their regulations after those of the Department of Commerce and that the next few years will not see the building up of a vast and conflicting body of ordinance and law such as prevails in the different states in regard to the automobile.

The Bureau of Aeronautics has cooperated with the industry in every respect — the December conference being an indication of the attitude taken.

Military and naval aviation has made progress of which the layman is unaware. Perhaps the most striking evidence of the progress is the announcement that the two branches of the service will place contracts which will give them an available force of over twelve hundred planes each. The miles per plane and miles per aviator in each branch of the service has been increased greatly and with a lowering of the accident record.

Abroad, developments have kept pace with our strides, but in a less spectacular fashion. Passenger transport is taken as a matter of course, and less is thought of the commercial possibilities than here. However, several outstanding events may be set forth as identifying the year.

De Pinedo—Four continent flight.

Costes and LeBrix—Paris to Rio de Janeiro.

Van Lear Black—19,000-mile taxi trip.

K. L. M.—Amsterdam-Batavia mail service.

The probable establishment of Sir Allan Cobham's gold carrying line from Johannesburg to London and India appeals to our imagination, as does the business trip of Mr. Black to the Dutch East Indies.

We are accustomed, unfortunately, to rest content with the assumption that Europe is far ahead of us in aviation matters and be content with such a statement. As a matter of fact, Europe is ahead of us in the utilization of passenger carrying planes, but she has nothing approaching our air mail.

We can pride ourselves on the fact that the progress that has been made here has been the product of individual initiative and that no subsidies have been paid any operating companies. The development may be slower but it will be along surer and more profitable lines.

Over the ice floes on the Newfoundland sealing expedition.

Free Lancing in The Air

As told by C. S. Caldwell to E. L. Chicanot

Romance — adventure — thrills — hardships — all these attend the life of the roving free lance of the air. It is not often that such a clear picture of this life can be given as in this fascinating story of real life.

FREE lancing, no matter what the manner of pursuit, exerts a very powerful appeal which most men by force of circumstances are compelled to resist. There are some of us so constituted, however, as to be unable to tolerate life in a groove, and our number has greatly increased since the war. The most interesting and engrossing of routines, because it is a routine, palls in time, and the urge comes to break it and seek new places, new people, and new conditions of life. It may be that a rolling stone gathers no moss, but it accumulates some wonderfully compensating experiences as long as it continues to meander. There is certainly variety to the life of the man who never permits himself to feel bound by the chain of economic circumstances, but at liberty at all times to follow his own sweet will and move hither and yon as the impulse takes him.

And of all roving careers, it seems to me that of a free-lance air pilot, willing to take on any commission, to fly anywhere, is about the most alluring, as capable of satisfying every craving for change and excitement. When in addition the sphere of operation is the broad and raw Dominion, it seems to me that the very apogee of adventure and romance must be reached. That, at least, is how I feel looking back over the last four years in which I have done some of the most out-of-the-way flying in Canada.

It has only just occurred to me to think of this. I have seen so much written of the exploits of trans-continental, trans-Atlantic and other spectacular flying that I have come to see the phase of civilian flying in Canada in which I have been engaged in a new light. When I learn of all the assistance rendered and the elaborate precaution taken to ward off possibility of mishap in these flights, I think of the hundreds of hours spent in the air when a slight accident might have resulted in a catastrophe of which the public might never have heard anything. When I consider in addition the unusual phases of Canadian life I have seen, replete with episode of every kind, I begin to appreciate that it has been a fascinating career, and it occurs to me that a brief account might be of some interest.

It was three years after the war when, having become steadily more bored with ground existence, I seized the opportunity to get back to flying and joined the Laurentide Air Service as air-mechanic. The company was that summer engaged in aerial survey for the Ontario Government in the James Bay area, operating five planes and flying crews. Our base was at Remi Lake, about fifty miles west of Cochrane, and we spent the entire summer in the territory over more or less routine sketching. It sounds prosaic and generally was, though it might not have been.

Each day each pilot made a trip of four and a half hours, during which the mapping and sketching were done. For part of the season's work we operated from a base at Moose Factory. There the day's flight carried us over

a huge marsh or floating muskeg extending for forty miles south of the Bay. It was an indescribably desolate looking region, nothing but oozy swamp, with here and there little patches of water showing. There was not a landing place in all of its extent. The four and a half hours' sketching was spent in flying from one possible landing place to another, with lots of time in between to wonder what would happen if one had to make a forced landing.

Forced landings were made in peculiar circumstances at times. Once when flying further south, returning to the base after surveying all day, we ran into a heavy rainstorm and, after buffeting it for some time, were forced to land in a small lake which came conveniently to hand. It was only after the storm had subsided that we discovered how painfully small it really was. We attempted to take off, but the machine would not climb quickly enough to clear the trees at the end of the lake. I did some rapid thinking, but there seemed nothing else to do but turn and hope for the best. As was almost inevitable, the machine struck the water very awkwardly and commenced to sink right away. It was all we could do to clear ourselves, and we had no time to recover emergency rations, matches, or anything else before it disappeared with a gurgle, leaving us to swim in our clothing to the shore.

Luckily this was not far away or we might never have made it, but we realized thirty miles of practically uninhabited wilderness separated us from our base. The only route to follow in the gathering darkness was along the bank of a river flowing out of the lake, mud bottomed and brush covered. Throughout the day we forged along in the blackness, practically feeling our way, and it was a very weary, grimy, and famished pair that next morning stumbled into a trapper's shack many miles from the flying base.

On another occasion a pilot out on the survey miscalculated the amount of gasoline he carried or tried to make it go too far. Anyhow, he suddenly found himself thirty miles from the base with a spluttering motor, and the only body of water in sight was a lake of painfully small dimensions. Gravity will take a machine a long way under such circumstances, but there are limits, and there was nothing to do but endeavor to hit that lake. Luckily the pilot accomplished this safely. Realizing that the plane would be the best means of attracting attention to their plight, the three occupants moored the boat fast in the middle of the lake and swam ashore with the emergency rations, prepared to spend the night.

Flying down from Moose Factory that same evening, I crossed directly over the lake and spied the plane there. Realizing that the pilot would never have alighted there by choice, we came down and circled the lake several times before we made out the three figures on the shore gesticulating wildly to draw our attention. It was quite impossible for us to land with that plane already occupying the lake, and in addition that machine was the only one of the fleet possessing quick enough take-off and rapid climbing powers to get out of such a restricted area. There was nothing to do with dusk closing in but to continue on to the base and hand in the information that one of the machines was down in a duck pond thirty miles away.

Early on the following morning I set out again in a machine with a mechanic to see what I could do, but without the glimmering of an idea of what for my assistance was going to take. Reaching the lake, I flew down low and began circling about. Almost immediately my attention was directed to the words "DROP GAS" printed in gigantic letters in the mud of the beach. Deciding that this plan was better than any of mine, I returned right away to the base. Here we secured five stout five-gallon cans, filled them with gasoline, and crated them with strong boards. Loading them on the plane, I tuned up and set out again for the lake where the three were marooned.

Arrived over it, I flew the boat as low as was prudent parallel to the shore, and on each circuit at precisely the same spot the mechanic released a case of the fuel. I could see the pilot of the stranded plane standing stark naked upon the beach, eager and expectant. As each consignment hurtled down he made a wild dash through the water after it. We had no way of determining what success we had, which to me was rather problematical, as at that height and at the comparatively low speed at which we were traveling water is practically solid. The three seemed to be signalling that all was well, however, and we returned to the base. The missing plane came in the same afternoon. Two of the five containers had survived the terrible impact, and the trio was able to fill up the tank and get out of the lake.

C. S. Caldwell.

After an idle winter, I engaged for the following summer in what was comparatively prosaic flying work, aerial forest fire patrol for a pulp and paper company, which owned large reserves in Quebec. There was nothing especially out of the ordinary about that summer's flying except that the season was one of the worst for many years from the standpoint of fires. Most of the patrol work was carried out every day in a thick haze of smoke which made flying somewhat difficult. Fall was reached, however, without any mishap or the experience of any episode sufficiently unusual to have been registered permanently on my mind.

The only amusing incident I recall of that summer pertains to another pilot who was also doing forest patrol

work. His one dread of traveling through the woods alone appeared to be bears. When one afternoon he was compelled to make a forced landing and abandon his plane far from his base his principal apprehension was that he might encounter one of these usually harmless animals. Accordingly part of his salvage from the disabled plane took the form of a tin can, and as he proceeded through the dense brush endeavoring to make his way back to the base he kept up a ceaseless tattoo, with the object of scaring off any bears in the neighborhood. The plan was successful in another direction, for the strange hammering was heard by a trapper whose place the airman was unconsciously passing and he crawled curiously through the bush to investigate. The two came upon one another to mutual surprise, with the result that the stranded pilot found food and shelter long before he had anticipated them and was put safely upon a trail which led him back to his base.

Caldwell and the plane flown to the Quebec gold fields.

During the year 1924 the Laurentide Air Service, with which I was associated, established the first passenger and express air service in Canada. Strange as it may seem, this was not between any of the main centers of population, but from the edge of civilization into the newly discovered gold field of northwestern Quebec. The plane jumped off from Haileybury on Lake Temiskaming and landed in the primordial wilderness of Rouyn. In the pioneer days of that mining field I think it must have been the most unique flying service in the world, and mining authorities have since paid it the tribute of having set the development of the Quebec gold field ahead by two years at least.

From our base at Haileybury we undertook to drop passengers or express in any part of the gold field where there was a lake, a condition easily met, since the area was plentifully dotted with bodies of water of varying extent. There was no great rush of passengers at first, though it took a good five days of strenuous paddling and slow consumption by mosquitoes and black flies to reach the heart of the gold belt, a journey we accomplished in almost exactly one hour. Men, who without a thought would face many kinds of death in the wilderness, found many excuses for not using the plane. We continued to carry in express of all sorts, however, without any mishap whatsoever, and gradually confidence grew and we began to get more passengers. In the height of the season we were transporting in and out of the gold field an average of thirty passengers per week.

I am sure the aeroplane has never been requisitioned for such multifarious services or the proud ship of the air been subjected to such indignities in the way of loadings, as in this daily service to the gold field. I have loaded into my plane for transport to the mines every imaginable kind of commodity—fresh meat, fruit, vegetables, eggs, dynamite by the box, horseshoes, and even dogs and cats. I once flew over the sixty miles of wilderness with fifteen-foot lengths of heavy piping strapped to the wings, and on another occasion a five hundred pound pneumatic drill was dismantled and stowed away in various parts of the plane's capacious interior and was delivered safely to a Rouyn mine. An entire drum of gasoline was taken in on one trip through dividing it into two parts and putting one in either cockpit. There was very little stuff we had to turn down. So greatly did the mining camps come to depend upon us and rely upon our service that I once came upon a teamster who was convinced that a new team of horses which had been ordered and was expected would come in by plane.

About the only thing we did not knowingly carry was liquor. We sometimes took it in when we had no control over the consignment. One day two noisily happy and quite inebriated individuals, miners or prospectors returning from celebrating, approached me as I was tuning up and expressed a hiccoughed desire to be transported by air into the Rouyn. As they had their fares I could not well refuse them, even had I felt inclined. However, suspecting the possibility of there being more liquor in their packs in addition to what they were carrying on their persons, I stowed these well away aft in the boat and placed the two side by side in the forward cockpit.

The first experience of a take-off is just a bit disturbing, and this had a decidedly sobering effect upon my two passengers. For some time they remained quiet as they glued themselves to their seats. This seemed to very rapidly wear off. I saw the two heads temporarily disappearing as they went down periodically, apparently for refreshment. I was not apprehensive at all, however, until suddenly a quart bottle, seeming to me about the size of a balloon, whizzed past the propellor. Then I observed one of my passengers was up on his feet, swaying unsteadily, swinging his arms with clenched fists and in the most bellicose manner inviting the other to combat. A second later the fight was on, the two grappling and struggling in their narrow, unstable quarters. I didn't know what to do. In fact, I knew there was nothing which could be done but fly on as straight and steadily as possible. I watched fascinated as the two men in front of me swayed from side to side, tightly locked in each other's embrace, momentarily expecting them to topple out as one gained a temporary advantage and pressed the other ominously back over the edge of the cockpit.

Fortunately nature decided to take a hand. We struck one of those sudden gusts of wind and the machine dropped several hundred feet in that sickening manner which makes the novice think his stomach has left him, ending up with an abrupt jolt as if the earth had come up to meet us. Just exactly how it registered upon the minds of my two passengers I don't know, but they subsided in the bottom of the cockpit and I neither saw nor heard any more of them. I understood why when on landing the two were discovered to be so utterly incapacitated as to have to be carried out and to shore bodily.

I have never ceased to marvel at the way in which the comparatively low hazards of flying are regarded by men who day after day work on the edge of far more imminent catastrophe. It reminds me of an occasion on which an engineer in the Rouyn engaged a crew of especially heavy and husky miners to sink a shaft, and the work being pressing arranged to have the men flown in. I think I took in not only the first mining crew to ever be transported by air but probably one of the heaviest aggregations of humanity ever flown. I contracted for this by the head, though I was sorry after seeing my prospective passengers that I had not taken the job by the pound. Not one of them was under 200 pounds and several considerably over. They were all foreigners, and it was easy to determine by the way they regarded the plane they were not anticipating the journey ahead of them with any great pleasure.

Deciding to get the worst over at first I loaded up with the four heftiest of the scared crew. The pick of the quartette, who seemed to be also the most terror-stricken, I placed on the seat beside my own, assuring him this was a position of much greater safety than that occupied by the others. As a matter of fact I knew that the balance of the machine would not be so much upset with his colossal weight nearer the centre of gravity. I left him there to tune up but could observe the blonde giant was becoming more and more nervous. He insisted on trying to talk to me and nothing I could do would discourage him. Finally he became so earnestly importunate, standing up in his place, endeavoring to shout something it was impossible to hear above the roar of the engine, that I came to the conclusion it was something important. After having had some difficulty in tuning up I shut off the engine and asked him what was wrong. In a quavering voice he said "If anything happens to me tell my mother. She lives in Poland."

I informed him somewhat curtly that if anything did happen I expected to be in on the party and tuned up again. After running an undue distance along the water the plane staggered off into the air, and an hour later I delivered a nerve-wracked mass at the mine where next day these men who had been thrown into a panic by a brief journey in the air would quite heedlessly expose themselves to the hazards of blastings, cave-ins, and other accidents, all in the routine of mine workers.

It was on a flight out of the Rouyn that I had an experience which might easily have had a fatal ending. I had no passengers from the gold field and made up a load with odds and ends of

Flying boat at the Factory in James Bay.

express. Included in this assortment were two personal pack sacks and a box of ore samples. Not long after leaving the Rouyn I detected a strong aroma of burning paper but at first paid no attention to it as ground odors are much in evidence several thousand feet in the air. The odor became so strong however, that I became a little nervous and this increased until I decided to make a landing and picked out a convenient lake for the purpose.

It proved a wise course as I discovered on investigating that the box of ore samples which had a high sulphur content were in a state of combustion and very shortly in the stiff breeze would have burst into flame. That would have been a pretty predicament two thousand feet off terra firma.

It will perhaps hardly be credited that ground smells are evident at such a height, but it is nevertheless a fact. I recall one occasion on which the odor of skunk was so powerful at a height of five thousand feet that one would almost have sworn the unpopular civet was an unbidden passenger in the machine.

Flying from the Rouyn I had the unique honor, as far as I know, of carrying the first and only stowaway in the history of aeronautics. My practice was to fly into the gold area with passengers and express offering, anchor the boat out in the lake, and make the return trip on the following day. One morning, after spending the night at one of the mines, I was paddled out in a canoe to the plane, got aboard, and tuned up. I had no passengers and little express so that I considered I was lightly burdened and lost no time in taking off.

As soon as I was well up in the air, however, I realized there was something wrong with the machine. She was what we call "tail heavy." Despite all I could do she would not straighten out and the tail persisted in dragging like that of a depressed pup. I continued right on, however, though I'll admit I was just a trifle nervous and felt distinctly relieved when I finally alighted upon the water of Lake Temiskaming.

Two mechanics rowed out to help me moor the boat and I told them my trouble. It puzzled them as they had but recently overhauled the boat, and they proceeded to make a rough survey at once. The source of the trouble

was discovered when a chance look over the edge of the rear cockpit disclosed a pretty scared and chilled human. We hauled him out and he told a moving story of loneliness and wanting to get out of the country and see his family but lacking the funds, when he had seen the plane and recklessly swam out and climbed aboard. We read him a sermon on the possible results his stolen ride might have had in wrecking the plane and endangering the life of the pilot as well as taking long chances with his own carcass, but the whole affair struck us as so novel and extraordinary, and after all I had come safely out of it, that we did nothing further but saw him on his way to the family he was so anxious to link up with.

The plane with the sealing fleet.

Aircraft managed to revolutionize gold mining without any great trouble or opposition, but the same could hardly be said of my next sphere of activity—the sealing banks of Newfoundland. There I not only undertook what I think is the most hazardous form of flying in Canada, but did so in the face of the most deep-rooted conservatism and unreasoning scepticism. I don't think there is any doubt now but that the sealing captains have been brought round to a conviction of the unique value of the plane in their annual expedition, but the bulwarks of tradition have been broken down with difficulty and the admission will only be made with extreme reluctance.

Every spring for the past 163 years the sealing vessels have sailed or steamed out of St. Johns, Newfoundland to prosecute the search for seals in a manner that has, up to the last year or two, remained almost identically the same. The actual business of locating the seals is very much like a game of hide and seek as the expansive ice floes upon which the young seals have been born break up badly and drift with the elements in any direction. The vessels merely make the best of their way north, breasting the icy seas, battling with blizzards, forcing a slow and perilous way among the ice floes. Each captain has his own idea of where the seals may be that particular spring and heads roughly in that direction, making sometimes only a few miles a day through the ice field, while a vigilant lookout is kept for indications of the seal herds.

The principal one is the formation of the ice, which is of three kinds. Slob ice is newly formed and blackish in color owing to the water showing through. Arctic ice, formed far north and drifted down, is rough and hummocky and generally contains much snow. Sheet ice is the second stage of slob ice and is found in large flat sheets. This is the ice on which the seals are found, as the old seals must make their bobbing holes when the ice is comparatively thin. These are apertures kept open as the animals come up periodically to breathe.

In the past observation for such ice has been from barrel towers at the mast head, eighty feet above the deck, by lookouts scanning the icy prospects with powerful telescopes. The difficulties can be appreciated. Small openings are not easily seen and the young seals, snow white, are practically indistinguishable against the icy background. It is even difficult at times to see the older, darker seals where the ice is rough and hummocky, and they may be concealed in the hollows. Often vessels have steamed for weeks without encountering seal patches, passing within a few miles of thickly dotted floes.

The possibility of utilizing the aeroplane in sealing was first suggested to the sealer owners of Newfoundland when the machine especially constructed for the Shackleton expedition was left behind and remained long unutilized. Finally the owners of the sealing vessels jointly purchased it and in 1923 they brought out a pilot from England to operate it on the spring expedition. The attitude of the sealer captains towards this innovation was pronouncedly skeptical, not to say a trifle hostile, and as a result the fleet returned from the hunt with the plane still fastened aft, having never been flown. In 1924 it was sent out again with Capt. B. Grandy, a veteran airman of the Great War and himself a former sealer commander. He was scarcely more successful but at length, the seal hunt being protracted, days and weeks passing without any trace of the seals being encountered, the captain of the vessel carrying the plane consented to stop long enough to land it and give him opportunity for a flight. But the one flight was made but it was responsible for locating several large patches of seals, one containing upwards of 50,000, four miles long and eight miles wide, and putting the sealing vessels in touch with them.

In the spring of 1925 the sealer owners seemed to experience some difficulty in securing a pilot to go out with the fleet, and at length got in touch with me. As the result of successful negotiations I went down to St. Johns and joined the fleet just prior to its sailing. The plane I found was a Baby Avro, equipped with wheels, floats, or skids, so that it could be flown off the ground, water, snow, or ice. It was a light machine, easily assembled and transported, and carried sufficient fuel for two hours flight. It left with the fleet mounted upon a specially constructed aft deck, this being for transport only.

I thoroughly enjoyed the sealing expedition in its novelty and daily hazard, though I couldn't help but feel from the beginning that I was regarded as superfluous and intrusive. Men who had gone out with the sealing fleet from the time they were boys were

naturally sceptical of such revolutionary innovations, and their attitude expressed resentment that anyone from the effete outside world should imagine he could improve upon the traditional methods of the hunt. These antiquated methods annoyed me and made me impatient. I knew that in half an hour I could cover as much observation as was being done in a day. But the sealer captain is absolute lord and master on the expedition and it was useless trying to press the matter.

Finally, however, I was given my chance. Time passed and no signs of the seals were encountered. The captain had an idea they were in towards the land, where the way was obstructed by heavy ice, through which progress would have been the slowest. He asked me to make a flight over it. The sealer was accordingly tied up to the floe and the plane lowered. The crew were put to work smoothing out the rough surface and soon prepared sufficient space for a take-off. I hopped off successfully.

I was away an hour and flew between thirty-five and forty miles. I encountered no seals but on the contrary ascertained by the formation of the ice that the desired animals could not be in that direction. I returned to the ship with this information which could otherwise have been secured only after the loss of days of valuable time. It decided the captain to steam in the diametrically opposite direction from that which he had intended.

Two days later I made a second flight under orders from the captain, flying between 70 and 80 miles and almost immediately spotted a small patch of seals—stragglers, but indicating the position of the main herd. Without the help of the plane they would certainly have been missed altogether. The information I brought back decided the captain to change his course with the result that at noon the next day the seal herds were encountered and the objective of the expedition attained.

Accompanying the sealing fleet I have no hesitation in saying is the most hazardous form of flying in Canada. First one is operating in an intensely cold temperature and it is difficult to get the machine started. It is not always easy to find a suitable place for a take-off. Often a long runway will be cleared on a narrow floe of ice and by the time one returns the wind has changed and it is necessary to make a landing on the narrow width. The machine is necessarily small and the equipment not very elaborate. The only instruments the pilot has are an at times inaccurate compass and a watch. A forced landing while on a flight means very great risk. The ships would, of course, set out to look for the pilot if he failed to return in reasonable time, but ice floes are never stationary nor is it possible always to determine their trend, so that by the time they had reached the place where he had come down he might have drifted very far away.

On returning from the sealing fleet in the spring of 1925 I joined the expedition of a syndicate of United States mining capitalists, for exploration work in the unexplored regions of the Yukon and Northern British Columbia, as assistant pilot-mechanic. Incidentally this was, to the best of my knowledge, the first mineral prospecting party to plan the use of the aeroplane. Colonel Williams, who was in charge of aerial transport, and I appreciated quite keenly that the territory to be flown over was isolated, largely unexplored, and but very inaccurately mapped, and realized the hazards and difficulties of such an expedition as we were setting out upon. We dug up all the available data on the country but this was painfully fragmentary and left us little better off. The machine we were to fly, a Vickers Viking amphibian, was shipped by rail from Three Rivers, Quebec, to Prince Rupert, British Columbia, and we were there ready, with the plane assembled, to commence our air trip on June 1st. Altogether we made up a party of nine.

We flew from Prince Rupert to Wrangell Island where we refuelled, thence directly over the coast range by way of the Stikine Valley, and on to Telegraph Creek. It was a route of exquisite wild loveliness, as we sailed over glittering glaciers, high white-capped mountain peaks, and saw the ribbons of innumerable rivers winding below. We made a landing on the Stikine River and established camp there to await the breaking up of ice on Dease Lake.

On June 13th word was received that the ice on Dease Lake had broken up and on the following morning we made an early start with the entire outfit, consisting of nine men, tents, dogs, and other equipment, to fly to our main base which was to be located at the head of Dease Lake. The distance from Telegraph Creek was more than seventy miles over a country absolutely devoid of landing places. A forced landing over this stretch of country would have spelt not only failure to the expedition but in all probability disaster to all of us. We had fortunately no such mishap and the entire miscellany was transported to the head of Dease Lake in forty-five minutes. Ours was the first machine to have ever crossed this height of land. An altitude of three-thousand feet having been maintained after leaving Telegraph Creek we found we were only five hundred feet above water over Dease Lake, as that body is located twenty-five hundred feet above sea level. After having ascended three thousand feet on the

(*Continued on page 70*)

Towing seals to the ship.

Ocean Flight Forecasts

NEXT year's trans-oceanic flights will be aided by much more comprehensive forecasting of the weather over the oceans than has been attempted to date. Flyers who made the trans-Atlantic and trans-Pacific flights during the past summer are agreed that "picking your weather" is the prime factor in the cuccess of such attempts. One of the principal difficulties in forecasting flying weather is that the meteorologist and the aviator do not talk the same language. The forecaster and the sailor understand each other, but the terms common to them have little meaning to the flyer. The first step that will be taken in extending the scope of ocean weather forecasting will be to establish a terminology that is understandable—that signifies, unmistakably, fair weather or foul to both the forecaster and to the flyer.

Filling pilot balloon preparatory to making upper air soundings.

Computing and recording wind aloft conditions secured by pilot balloon.

Some features of the U. S. Weather Bureau's forecasts have been of about as much value to flyers as was Miss Ruth Elder's description for meteorologists of the weather encountered on her trans-Atlantic attempt.

"The first night the weather was marvelous. The second night it was terrible and the low pressure, oh, so low." Miss Elder's meteorological observations were made at a conference in Washington on November 14 of ocean flyers, forecasters of the U. S. Weather Bureau and a committee on aeronautical meteorology of the Guggenheim Fund for the Promotion of Aeronautics.

Predicts Sores of Flights

William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, predicted following the conference that scores of ocean flights will be made next year and that a plan will be worked out immediately to develop the Weather Bureau's service is preparation for them. In addressing the conference he had explained that it was called in the interest of both civil and military aviation, that the weather and weather forecasting are of the greatest concern in ocean travel, and that matter-of-fact reports on the forecasts made before each flight this year and the weather actually encountered during the flight would be helpful in determining what improvements can be made in oceanic forecasting.

Confidence in the future of trans-oceanic air travel is expressed by General Delcambre, the French meteorologist, in a cable sent to American transoceanic flyers in care of William P. McCracken, Jr., Assistant Secretary of Commerce for Aeronautics. General Delcambre is chairman of a subcommittee on Ocean Meteorology of the International Meteorological Committee.

"I am counting on you to help the meteorologists in obtaining objective and practical results in the gigantic enterprise of which the American and French aviators have been the heroic leaders," General Delcambre's message read. "Please be assured of my devotedness to your cause which for seven years I have defended before the International Meteorological Committee."

When in conference with ocean weather forecasters in Washington on November 14 the American aviators sent a message of greeting to General Delcambre in which they declared that the success of his work on securing information on upper air conditions over the ocean is "absolutely indispensable to the future development of trans-oceanic flying." The message was signed by Charles A. Lindbergh, Berndt Balchen, Clarence Chamberlin, Charles Levine, Ruth Elder, George Haldeman, William S. Brock, Edward F. Schlee, Lester Maitland, Albert Hegenberger, Emory Bronte, Arthur Goebel and Paul Schluter.

Both Atlantic and Pacific flyers, several of who are planning flights in

1928, recounted their experience with weather conditions on their flights this season and the discussion developed several definite lines of thought. The flyers had no fault to find with the ocean forecasts which were made for their flights, but had numerous suggestions for extending the scope of this service. Clarence Chamberlin, pilot of the Columbia on the flight to Germany, recommended that until measures requiring further research could be taken, arrangements should be made for more reports from ships, and Lieutenant L. Maitland, the first to fly from San Francisco to Hawaii, stated that the ships should be requested to give more accurate information concerning barometric pressures and wind speed.

Any information that can be obtained on conditions aloft would be very valuable, according to Mr. Chamberlin. Data on the heights of storms and of the various types of clouds, he explained, would enable the pilot to judge what "ceiling" he can expect and to determine whether it is possible to climb over them or safe to come down through them.

Must Learn Law of the Winds

Paul Schluter, who won second place in the Dole air race from San Francisco to Hawaii, stated that observations taken on shipboard cannot be relied upon absolutely, as different conditions prevail in the upper altitudes. To forecast flying weather, he said, it is necessary to learn the "law of the winds." He suggested that some progress might be made along this line by taking observations from captive balloons at different altitudes at the same time that observations are made at sea level. Lieutenant Al F. Hegenberger, Maitland's companion on the flight to Hawaii, also stated that data on the heights of storms would be valuable as, with improvement in plane design, it will be possible to climb higher and higher.

Ocean flying will become much less hazardous with the use of floating airdromes, said Lieutenant Hegenberger, as the opportunity to refuel will permit the plane to carry a lighter load and navigate at extremely high altitudes when necessary to escape the weather below. Although the development of the radio beacon is most promising, Lieutenant Hegenberger said that because of static interference and the possibility of mechanical failure entire reliance cannot be placed by the air navigator on this means of guidance any more than a ship can depend solely on the gyrocompass.

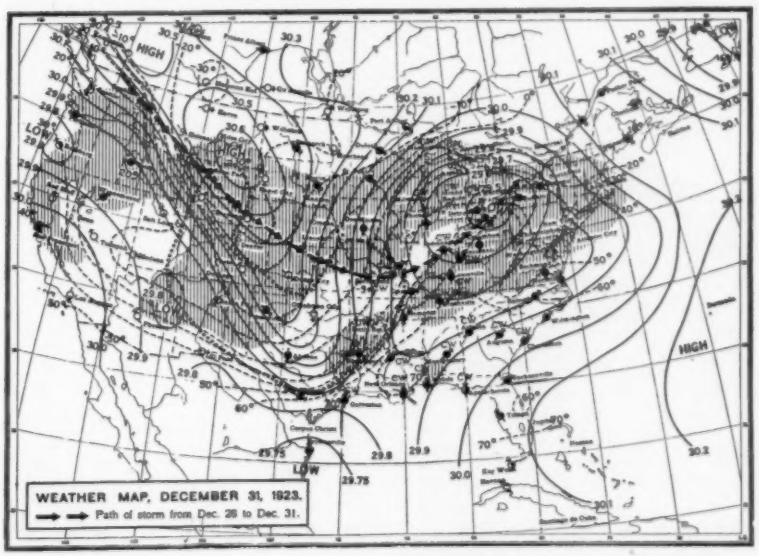
Weather conditions over the Pacific also were described by Colonel Arthur C. Goebel, winner of the Dole race to Hawaii, and by Emory Bronte, who accompanied Ernest L. Smith on a flight to Hawaii, landing on the Island of Molokai. Goebel explained that the Dole flyers were directed by radio beacon, that he flew above the clouds over practically the entire course and did not dodge anything.

True Forecasting

Dr. C. G. Rossby, chairman of the committee on aeronautical meteorology of the Guggenheim Fund for the Promotion of Aviation, explained that determining the conditions for a successful ocean flight is forecasting pure and simple and presents a much more difficult problem than forecasting the weather over the United States for cross-country flights, which is largely a matter of co-ordinating the observations made by Weather Bureau stations along the line of flight.

Dr. James H. Kimball, of the U. S. Weather Bureau, who provided the weather data for the trans-Atlantic flyers, stated that the type of forecasts given to Lindbergh, Byrd, Chamberlin, Elder and others differed from the type given to airmen generally. He explained that in "mapping" the north Atlantic from day to day there is nothing to go by except reports from a few ships strung along the steamship lanes. For that reason, he said, no attempt was made to forecast other than general storm areas and the prevailing winds. It was impossible to predict the weather on the other side 48 hours in advance, he said.

The weather forecasts for the Lindbergh and Chamberlin flights were similar, according to Dr. Kimball. He said that both flyers had waited for a favorable "map." The exception was the Elder-Haldeman flight. A storm was encountered near the other side that they had been warned against in advance, but that they had decided to go through it. Dr. Kimball stated that this decision was made largely from a lack of undersanding of terms between the Weather Bureau and the flyers.



Specimen weather map.

Both Haldeman and Chamberlin said that they had no fault to find with Dr. Kimball's forecasts. After studying the weather maps for thirty days, Haldeman said, he decided that the low pressure area off the English channel could be flown over. They met it as predicted and succeeded in getting above it for about an hour, but then began to lose altitude on account of the motor trouble which forced them to alight a few hours later alongside the Dutch steamer Barendrecht, which carried them to the Azores. Chamberlin stated that he "hit everything just as predicted, with the exception of the finish," and Charles Levine, who accompanied

Chamberlin, commented that if they had followed Dr. Kimball's advice and waited a few days longer they probably would have set up a better record than they did.

Edward F. Schlee and William S. Brock stated that on the Atlantic leg of their attempted round-the-world flight the forecasting was very good and that they found the weather just as Dr. Kimball said it would be. They obtained a detailed weather report at Croyden Field, London, for the hop to Munich, Germany, but from then on, nothing, until they reached Shanghai. Mr. Brock said that if they had had forecasts like Dr. Kimball's for the entire flight they would have been far better off.

Balloon and theodolite used in making upper air soundings. Readings are taken every minute.

Neither Colonel Charles A. Lindbergh nor Commander Richard E. Byrd was present at the conference, but Berndt Balchen, one of Commander Byrd's crew on the "America' in its flight to the coast of France said that, lost in the fog, they might have penetrated to Germany if they had known the weather conditions in advance and would have made Paris if their radio and earth inductor compass, which would have enabled them to get their bearings, had not been out of commission.

Dr. Kimball expressed confidence that, with the record of the practical observations made by the ocean flyers before them, the meteorologists will be able to improve both over-ocean forecasting and its utility to air navigators. They will begin working immediately on ocean weather maps specifically designed to meet the requirements of flyers. Charles L. Mitchell, of the U. S. Weather Bureau, suggested that the radio station at Lyons, France, could report weather conditions over Europe and that these reports in conjunction with reports from ships at sea would extend both the time and space range of the forecasts. Major William P. Blair, a member of the Guggenheim committee on aeronautical meterology, stated that an international committee of meterologists is conducting research on the ceiling of the various types of cloud formations.

Flood Relief Work

Airplanes played an important part in relieving the distress of sufferers from the recent floods in Vermont and western Massachusetts. They got into action early, and as soon as word came to the outside via amateur radio army machines were sent to survey conditions and report. Immediately on their return a fleet of seven machines was put into service to transport mail, food and blankets, the largest single consignment of relief material up to that time sent into the flood zone. The machines were also equipped to make a photographic survey of the Connecticut and Winooski river valleys, where the greatest damage of the disaster was caused.

Maj.-Gen. Preston Brown, commander of the First Corps army area, with headquarters in Boston, was a passenger in one of the planes. On the first relief trip no landings were made until Burlington was reached, packages of food and blankets being dropped into towns en route. A regular air-mail service from the Concord, N. H., airport to Burlington was also organized, for over 500 bridges were washed out, and neither railroads nor auto trucks could reach many of the stricken communities. A supplementary regular service from Montpelier to Burlington and to White River Junction was established by New York National Guard planes stationed at Montpelier, subject to the call of Governor Weeks of Vermont. R. S. Fogg of Concord piloted the Concord to Burlington mail flights. At Barre citizens set to work and made a temporary landing field in a hurry, as a matter of fact, in about 24 hours, showing what can be done in an emergency. About 150 men were put to work, trucking 60 tons of crushed granite to the edge of the field, spreading it around by hand, filling the depressions, marking out a circle and a "T," setting up an official wind indicator, cutting out a few trees, lowering a telephone cable, and by nightfall reported to Mayor Frank Small that Barre had an airport.

More than 6,000 pounds of yeast were delivered in three days by airplane to the flooded city of Montpelier, Vt., and other places during the recent flood disaster in the Green Mountain state through the quick wittedness of employees of the Fleischman Yeast Company's offices in Boston, and the enterprise of the C. H. Cross Baking Company of Montpelier.

The appeal for yeast for the bread was gotten through to Boston by the help of a young amateur wireless operator, who sent the message out on the air to be picked up by other amateurs and relayed by telephone to the offices of the yeast concern. As soon as the message reached the latter the New England divisional manager, Corwin Wickersham, Charles Milburn, their traffic expert, who rushed from New York, and Mercer G. Rhodes of the sales department got busy at the East Boston airport.

They engaged B. P. Billings of the airport corporation to pilot a plane to Montpelier, and also arranged to have two other planes stand by in readiness for yeast flights. Billings dropped many pounds at Montpelier by parachute and then sped to White River Junction, where he repeated the stunt for the Vermont Baking Company. Yeast was also dropped at St. Johnsbury, but he was unable to drop any at Barre because of conditions below. The first trip carried 600 pounds and many more pounds were dropped the same way Saturday and Monday and a later load of 1,000 pounds on Monday, Nov. 7, making nearly 5,000 pounds in all. Red Cross planes cooperated from Concord, N. H., taking part of the loads. Airplane shipments of the yeast to various stricken points will be continued until roads and bridges are passable, or other quick means of conveyance are available after the shortage is relieved.

Off. U. S. A.

Caterpillar Club

By Marvin Murphy

JUST why they call it the Caterpillar Club is a moot question. Probably the name was suggested by the fact that the parachute is made of silk, a product of the caterpillar cocoon. Maybe because the caterpillar, when it falls, apparently suffers no injury. Or, perhaps, the lowly caterpillar was honored since it does not hesitate to crawl out on some leaf high above the ground just as these club members have crawled out on the wings of planes to jump off into space.

Little more is known of the beginning of the club. The story most credited is that it grew out of a discussion among two newspaper men and an aviator at McCook Field, Dayton, Ohio, five years ago when jumping out of the sky in a parachute was about as wonderful as a trans-oceanic flight was last May. According to the story, First Lieutenant Harold R. Harris had just saved his life by jumping from a disabled plane at McCook Field. Morris Hutton, a reporter, and Verne Timmerman, a photographer, of the Dayton Herald, were discussing the thrilling event with M. H. St. Clair, of the parachute unit, and the three agreed that something should be done to perpetuate the memory of men who saved their lives by deliberately jumping into space.

However that may be, there has grown up in the last few years an organization known as the Caterpillar Club, one of the most exclusive, one of the most respected in the world. It has no officers, no dues and no by-laws. Its only requirement is that to become a member one must have jumped out of the clouds under circumstances that prevented any other means of reaching earth alive. Ordinary parachute jumpers, who jump for thrills or practice or fees, are not eligible. Even the aviator who leaves a disabled plane when he might have stuck by the ship and saved it is excluded from the club's rolls.

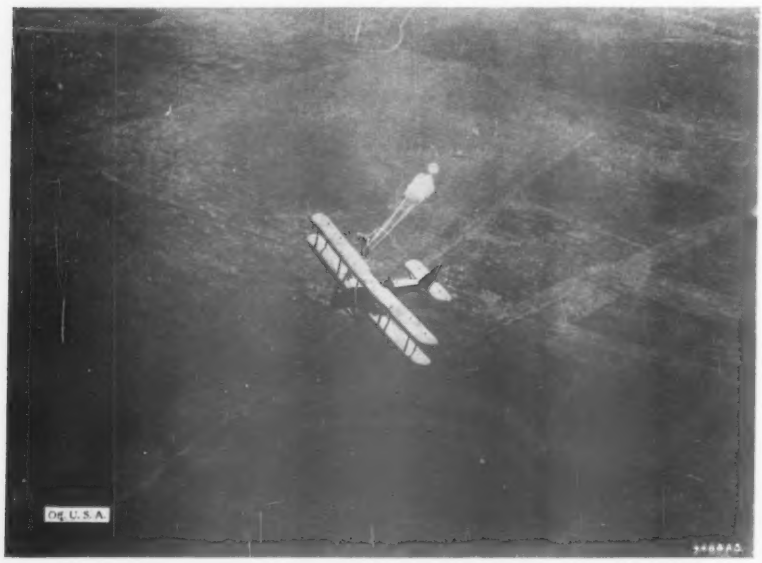
Records of the club are kept by officers of the Army Air Corps, and whenever a new member initiates himself by making an emergency jump, his picture and a short statement of the circumstances are entered in the club album. This and an occasional press notice constitute all the ritual and formality there is to the Caterpillars, though the material division of the army is considering an insignia in the form of a ring with a caterpillar mounted on a mulberry leaf.

Of late, as the parachute has come into more general use and as flying has become more and more extensive, the membership of the club has grown rather rapidly. There are now, according to the records, 56 members of the club, of whom 51 are believed to be living. In all they have made 61 emergency jumps, since several of them have had to jump more than once. Forty-eight of them were in the Army Air Corps, the Reserve Corps or National Guard units, 3 in the Marine Corps, 2 in the Navy, 4 in the mail service, and 4 were civilians.

If the Caterpillars were to elect officers, the president no doubt would be Col. Charles A. Lindbergh, for "Lindy" earned the right to that office before he ever undertook his memorable flight to Paris. He has jumped four times to save his life, more often than any other man. And perhaps, too, some recognition would be accorded the only woman member of the club, Mrs. Irene McFarland, who jumped from an army plane at Grisard Field, Cincinnati, and who was saved

by an army 'chute after a new type parachute which she was to demonstrate failed to open.

How does it feel to be stranded in an airplane falling like a meteor toward the earth or fluttering leaf-like in a spin, to know that you must jump or that in a few seconds it will be all over? What is the sensation when suddenly you find that the wings have fallen off your plane or the engine has burst into flames? Would you hesitate to jump? And, after you jumped, would you have any difficulty in pulling the right thing at the right time to get that parachute open?



In the brief and simple narratives of their experiences posted in the club album, the Caterpillars have answered questions like these. They have bared their hopes and fears and have set forth their mistakes so that other aviators might profit when their time might come.

Lindbergh, for instance, gives a graphic description of his predicament when he made one of his four jumps, this one on the night of September 16, 1926, when he was flying a mail plane a few miles east of Peoria, Ill. The gasoline supply in his main tank was exhausted and he was flying, blinded by clouds, with only twenty minutes supply of reserve fuel. Time and again he attempted to pierce the clouds and get some bearing and as he did the minutes ticked away and the precious gasoline ran through his engine. Ten minutes supply left! Nine! Eight! Seven! His engine sputtered and went dead! He decided to jump after failing in an effort to throw the mail overboard.

Now let him tell the story:

"I pulled the flashlight from my belt and was playing it down toward the top of the fog when I heard the plane's motor pick up. When I jumped the motor had practically stopped dead and I had neglected to cut the switches. Apparently when the ship nosed down an additional supply of gasoline drained down to the carburetor.

"Soon the ship came into sight about a quarter of a mile away and headed in the general direction of my parachute. I put the flashlight in the pocket of my flying suit preparatory to slipping the parachute out if it was necessary. The plane was making a left spiral of about a mile diameter and passing approximately 300 yards away from my chute, leaving me on the outside of the circle. I was undecided whether the ship or I was descending more rapidly and glided my chute away from the spiral path of the ship as rapidly as I could.

"The ship passed completely out of sight but reappeared again in a few seconds, its rate of descent being about the same as that of the parachute. I counted five spirals, each one a little bit further away than the last, before reaching the top of the fog bank. When I settled into the fog I knew that the ground was within 1,000 feet and reached for the flashlight but found it to be missing.

"I could see neither earth nor stars and had no idea of what kind of territory was below. I crossed my legs to keep from straddling a branch or wire, guarded my face with my hands and waited. Presently I saw the outline of the ground, and a moment later, was down in a cornfield. The corn was over my head and the chute was lying on top of the stalks. I hurriedly packed it and started down a corn row.

"In a few minutes I came to a stubble field and some wagon tracks which I followed to a farm house a quarter mile away. After reaching the farm yard I noticed auto headlights and a spot light playing over the roadside. Thinking that someone might have located the wreck of the plane, I walked over to the car. The occupants asked whether I had heard an airplane crash and it required some time to explain to them that I had been piloting the plane and yet was searching for it myself. I had to display the parachute as evidence before they were thoroughly convinced. The farmer was sure, as were most others in a three mile radius, that the ship had just missed his house and crashed nearby. In fact he could locate within a few rods the spot where he heard it hit the ground."

The plane was found two miles away.

Another pilot who was in danger of being hit by his own machine after he had jumped from it was First Lieutenant James T. Hutchinson, who, with Paul Stanley, a civilian observer, jumped when the plane caught fire near Dayton, June 17, 1926. But, whereas Lindbergh was on the outside of the spiral described by his plane, Lieutenant Hutchinson was on the inside, and his falling plane was a mass of flames circling about his silken parachute.

Something went wrong with the engine and there was a terrific explosion like "the firing of a huge cannon." The plane was 8,000 feet in the air.

"Immediately the flames filled the cockpit, coming up around our feet, and I realized that the fire wall had been blown out," Lieutenant Hutchinson wrote for the Caterpillar Club records. "The entire nose of the plane was on fire as I instructed Stanley to jump, which he did without any hesitation.

"I reached the left lower wing of the bomber where I clung to the flying wires and succeeded in collecting my thoughts. A stalling position had been

assumed by the plane, which was burning violently about the engine compartment and cockpit, with the engine firing irregularly. Also the path of flight was directly toward the city of Dayton.

By working myself up along side of the cockpit, I was able to reach through the flames and retard the throttle, after which the nose of the plane dropped and it went into a glide, spiralling to the right. The switches would also have been cut, but to do that would have necessitated placing my head in the flames the switches being located on the dash forward of the throttle. This over, I crawled out on the lower wing, looked to make sure the tail would miss me, and jumped. The service chutes opened nicely."

But his troubles were not over when he felt the parachute jerk open. He continued:

"Due to the speed with which events happened, no fear had been felt up to the time the parachute opened, but, finding himself over a considerable waterway and disliking the thought of drowning in the cold waters beneath him, the pilot, with the idea of being able to quickly disentangle himself from the parachute when he struck the water, first threw away his gloves, then unbuckled the parachute chest strap and one of the leg straps. Due to his weight being on it, considerable difficulty was experienced in attempting to unbuckle the second and remaining leg strap, and while engaged in this the thought came that with all the straps unbuckled there was considerable danger of losing hold of the parachute entirely and falling free, so all the straps were rebuckled.

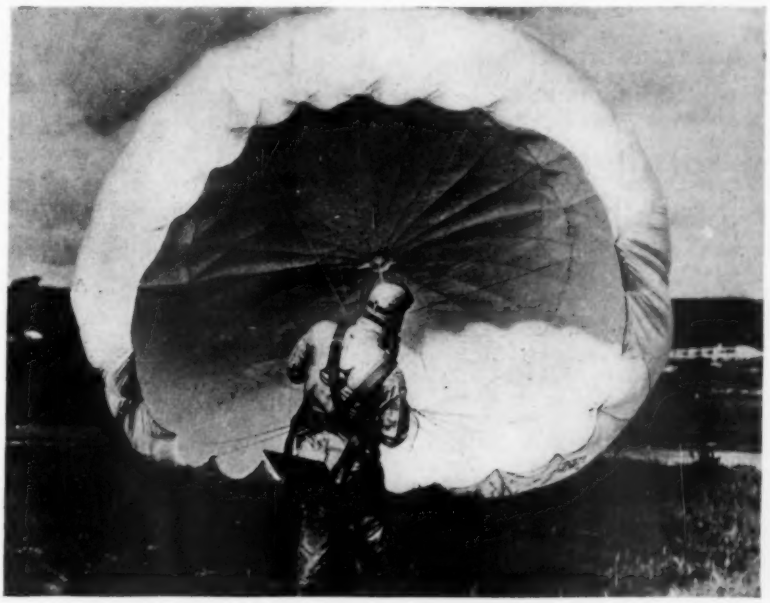
"A decision had then to be made as to whether it would be best to try and make one side of the waterway or the other, and, after some thought, it was decided to try for Harbor Island as presenting more open spots than the town side and the parachute was pulled down on the side in the direction in which it was desired to travel.

A position over the island having been gained, the next fear was of striking high tension wires or of landing on top of a house and then being dragged off the roof by the wind force on the parachute. Swinging considerably and growing rapidly more afraid of high tension wires, of which a considerable number were strung around below, the pilot was thrown against telephone wires and then in a heap on a plank road below.

"Upon landing he was for a few minutes considerably upset and remembers trying to impress upon a watchman, who appeared to feel that the pilot was intruding, that this sort of thing did not happen every day. In a few minutes, however, this feeling wore off and no ill effects of any nature were observed."

On two occasions, in March, 1925, and again in March, 1926, First Lieutenant Frank O'D. Hunter saved his life by jumping. In the second emergency, near Selfridge Field, according to his brief summary, something went wrong with the motor and steam began hitting him in the face. He tried to land.

"As I started to dive," says his report, "a great deal more water and steam came back and covered my goggles; then the whole front of the cockpit burst into flames. Flames came back in my face, burning off a good mustache. It was too hot for me. I undid belt, climbed on seat, and dove over side. I pulled the ring and chute opened, swinging me first one way then the other. Then I hit the ice."



Lieutenant Stephen A McClellan, who landed unhurt in the Potomac River near Haines Point, Washington, a few months ago, said that his plane just went to pieces and that he felt one thing go after another.

"I guess it was a wing came back at me covering the cockpit," he said. "I stood up and pushed on the obstruction with all my strength and it gave way. Then I hopped over the side. After turning over twice I found the parachute chord and gave it a yank. The rest was easy, except getting wet. Gosh, that water was cold."

First Lieutenant Victor E. Bertrandias had just flown over Baltimore on his way from Washington to Philadelphia when a wooden propeller let go and the engine broke partly loose from its mounting, the vibration thus caused sending pieces of cowling and wood hurling by the pilot's head. The plane went into a spin.

"I released my safety belt and made an effort to jump," he said. "To my surprise my effort was fruitless, for when I tried to jump I slid forward into the cockpit. That was my first real thrill, also mingled with fear. I became more or less frantic and a flash went through my mind that the ship was falling fast and the ground seemed seemed to be in sight. This was the first thought I had given relative to the ground or altitude.

"I was desperate and managed to get one foot slightly raised and placed on the forward part of the cockpit and with my hands placed on the side of the fuselage I kicked with all my force. The next think that I realized was that I had pulled the rip cord and the chute opened immediately. Evidently when I kicked and pushed I had thrown myself completely out of the cockpit.

(*Continued on Page* 68)

Official World and American Air Records

Established under Rules and Regulations
of the
FEDERATION AERONAUTIQUE INTERNATIONALE

Translated and compiled by the Contest Committee,
National Aeronautic Association, Washington, D. C.

WORLD RECORDS
Confirmed by
Federation Aeronautique Internationale

AMERICAN RECORDS
Confirmed by Contest Committee
National Aeronautic Association of U. S. A.

CLASS C—AIRPLANES
Returning to Point of Departure Without Refueling

Duration (Germany) Edzard and Risctics, Junkers W-33, Junkers L5, 230 H. P. at Dessau, Aug. 3-4-5, 1927..	52H. 22M. 31S.
Distance (Germany) Edzard and Risctics, Junkers W-33, Junkers L5, 230 H. P. at Dessau, Aug. 3-4-5, 1927..	4,660.62 Km. 2,895.97 Miles
Distance (Airline) (United States) Clarence D. Chamberlin, Wright Bellanca, Wright J-5, 200 H. P., Roosevelt Field to Isleben, Germany, June 4-5-6, 1927.....	6,294 Km. 3,911 Miles
Altitude (France) Sadi Lecointe, Nieuport-Delage Hispano-Suiza, 550 H. P., at Issy-les-Moulineaux, Oct. 30, 1923.....	11,145 Meters 36,564 Feet
Maximum Speed (France) Warrant Officer Bonnett, Ferbois Monoplane, Hispano Suiza, 550 H. P., at Istres, France, Dec. 11, 1924.....	448.171 KPH. 278.480 MPH.

SPEED FOR SPECIFIED DISTANCES
Without Pay Load

Speed for 100 Kilometers (United States) Lt. Cyrus Bettis, U. S. A. S., Curtiss R3C-1, Curtiss V 1400, 600 H. P., Mitchel Field, N. Y., Oct. 12, 1925.....	401.279 KPH. 249.342 MPH.
Speed for 500 Kilometers (France) Sadi-Lecointe, Nieuport Delage, Hispano-Suiza, 500 H. P., at Istres, June 23, 1924....	306.696 KPH. 190.567 MPH.
Speed for 1,000 Kilometers (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 H. P., Etampes, Aug. 29, 1925	248.292 KPH. 154.293 MPH.
Speed for 2,000 Kilometers (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 H. P., Etampes, Sept. 12, 1925	218.759 KPH. 135.930 MPH.

Duration Clarence D. Chamberlin and Bertrand B. Acosta, Bellanca Monoplane, Wright J-5, 200 H. P., at Roosevelt Field, L. I., New York, April 12-13-14, 1927.....	51H. 11M. 25S.
Distance Lts. Kelly and Macready, U. S. A., T-2, Liberty 375 H. P., at Wilbur Wright Field, Dayton, O., April 16-17, 1923.....	4,050 Km. 2,516.55 Miles
Distance (Airline) (United States) Clarence D. Chamberlin, Wright Bellanca J-5, 200 H. P., Roosevelt Field to Isleben, Germany, June 4-5-6, 1927.....	6,294 Km. 3,911 Miles
Altitude* Lt. C. C. Champion, U. S. N., Wright Apache, Pratt & Whitney "Wasp" Supercharged, 425 H. P., at Anacostia, D. C., July 25, 1927.....	11,753 Meters 38,559 Feet
* F. A. I. Homologation pending.	
Maximum Speed Lt. A. J. Williams, U. S. N., Curtis Racer, R-2C1, Curtiss D-12a, 500 H. P., at Mitchel Field, Mineola, L. I., N. Y., Nov. 4, 1923	429.025 KPH. 266.59 MPH.

SPEED FOR SPECIFIED DISTANCES
Without Pay Load

Speed for 100 Kilometers Lt. Cyrus Bettis, U. S. A. S., Curtiss R3C-1, Curtiss V 1400, 600 H. P., Mitchel Field, N. Y., Oct. 12, 1925.....	401.279 KPH. 249.342 MPH.
Speed for 500 Kilometers Lt. Alex Pearson, U. S. A., Verville Sperry R-3, Wright, 350 H. P., at Wilbur Wright Field, Dayton, O., March 29, 1923..	270.06 KPH. 167.80 MPH.
Speed for 1,000 Kilometers Lt. Harold R. Harris, U. S. A., and Ralph Lockwood, DH-4L Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., March 29, 1923	205.06 KPH. 127.42 MPH.
Speed for 2,000 Kilometers Lt. Harold R. Harris, U. S. A., DH-4L Liberty, 375 H. P., at Wilbur Wright Field, Dayton, O., April 17, 1923.....	183.83 KPH. 114.22 MPH.

CLASS C—WITH USEFUL LOAD OF 500 KILOGRAMS (1,102.31 LBS.)
Returning to Point of Departure

Duration (Germany) M. K. Schnabele and Fritz Loose, Junkers W-33, Junkers L-5 engine, 320 H. P., at Dessau, March 21-22, 1927.....	22H. 11M. 45S.

Duration Lt. H. R. Harris, U. S. A. S., Douglas DT-2 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., June 28, 1924.....	9H. 11M. 53.4S.

Official World and American Air Records

WORLD RECORD		AMERICAN RECORD	
Distance (Germany) M. K. Schnabele and Fritz Loose, Junkers W-35, Junkers L-5 engine, 320 H. P., at Dessau, March 21-22, 1927	2,735.586 Km. 1,699.81 Miles	Distance Lt. H. R. Harris, U. S. A. S., Douglas DT-2 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., June 28, 1924	950 Km. 590.3 Miles
Altitude (United States) Lt. H. R. Harris, U. S. A. S., U. S. A. TP-1 Liberty, 400 H. P., at McCook Field, Dayton, O., May 21, 1924	8,578 Meters 28,143 Feet	Altitude Lt. H. R. Harris, U. S. A. S., U. S. A. TP-1 Liberty, 400 H. P., at McCook Field, Dayton, O., May 21, 1924	8,578 Meters 28,143 Feet
Speed for 100 Kilometers (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 H. P., at Etampes, Oct. 7, 1925	281.030 KPH. 174.622 MPH.	Speed for 100 Kilometers R. Lockwood, Army CO-5 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., June 28, 1924	180.805 KPH. 112.346 MPH.
Speed for 500 Kilometers (France) Fernand Lasne, Nieuport-Delage 42C-1, Hispano-Suiza, 500 H. P., Etampes, Oct. 7, 1925	249.618 KPH. 155.105 MPH.	Speed for 500 Kilometers Louis C. Meister, Martin Bomber MB-2, 2 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., June 28, 1924	120.55 KPH. 74.90 MPH.
Speed for 1,000 Kilometers (France) Fernand Lasne, Nieuport-Delage, Type 42, Hispano-Suiza, 500 H. P., at Etampes, May 14, 1926	236.028 KPH. 146.660 MPH.	Speed for 1,000 Kilometers (No Record)	
Speed for 2,000 Kilometers (Germany) H. Steindorff, Rohrbach-Roland 3 BMW, 230 H. P. ea., at Staaken, July 31, 1927	205.407 KPH. 127.632 MPH.	Speed for 2,000 Kilometers (No Record)	

CLASS C—WITH USEFUL LOAD OF 1,000 KILOGRAMS (2,204.62 LBS.)
Returning to Point of Departure

Duration (Germany) Fritz Horn, Junkers G-24, 3 Junkers L-11, 230 H. P. ea., at Dessau, April 4, 1927	14H. 23M. 45S.	Duration Lt. J. A. Macready, U. S. A. S., Curtiss (Martin) Bomber, NBS-1, 2 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., Oct. 2, 1924	2H. 13M. 49.6S.
Distance (Germany) H. Steindorff, Rohrbach-Roland 3 BMW, 230 H. P. ea., at Staaken, July 31, 1927	2,315.338 Km. 1,438.680 Miles	Distance (No Record)	
Altitude (Germany) Herman Steindorff, Rohrbach-Roland, 3 BMW, 230 H. P. ea., at Staaken, Aug. 12, 1927	6,805 Meters 22,326 Feet	Altitude Lt. H. R. Harris, U. S. A. S., U. S. Army TP-1 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., May 22, 1924	5,100 Meters 16,732 Feet
Speed for 100 Kilometers (France) Fernand Lasne, Nieuport-Delage, Hispano-Suiza, 500 H. P., at Etampes, Oct. 16, 1925	246.440 KPH. 153.130 MPH.	Speed for 100 Kilometers (No Record)	
Speed for 500 Kilometers (Czecho-Slovakia) A. Jesek, Letov S-16, L-16, Hispano-Suiza, 450 H. P., at Prague-Nove-Benatky, Oct. 13, 1927	230.929 KPH. 143.492 MPH.	Speed for 500 Kilometers (No Record)	
Speed for 1,000 Kilometers (Germany) Herman Steindorff, Rohrbach-Roland, 3 BMW, 230 H. P. ea., at Staaken, July 29, 1927	214.855 KPH. 133.504 MPH.	Speed for 1,000 Kilometers (No Record)	
Speed for 2,000 Kilometers (Germany) Herman Steindorff, Rohrbach-Roland, 3 BMW, 230 H. P. ea., at Staaken	205.407 KPH. 127.632 MPH.	Speed for 2,000 Kilometers (No Record)	

CLASS C—WITH USEFUL LOAD OF 2,000 KILOGRAMS (4,409.24 LBS.)
Returning to Point of Departure

Duration (Germany) J. Risctics, Junker G-24, 3 Junkers 230 H. P. at Dessau, June 29, 1927	13H. 1M. 12.8S.	Duration Lt. H. R. Harris, U. S. A. S., and Mechanician Doug. Culver, Barling Bomber, 6 Liberty 400 H. P., at Wilbur Wright Field, Dayton, O., Oct. 3, 1924	1H. 47M. 10.5S.

Official World and American Air Records

WORLD RECORDS		AMERICAN RECORDS	
Distance (Germany) Herman Steindorff, Rohrbach-Roland, 3 B. M. W., 230 H. P. at Staaken, July 31, 1927	1,750.469 Km. 1,087.68 Miles	Distance (No Record)	
Altitude (Italy) Demenico Antonini, Captoni CA-73, 2 Isotta Fraschini, 500 H. P. ea., at Cascina Malpensa, May 26, 1927	6,262 Meters 20,544 Feet	Altitude Lt. H. R. Harris, U. S. A. S., Barling Bomber, 6 Liberty, 400 H. P., at Wilbur Wright Field, Dayton, O., Oct. 25, 1923	2,049 Meters 6,722 Feet
Speed for 100 Kilometers (Germany) Herman Steindorff, Rohrbach-Roland, 3 BMW, 230 H. P. ea., at Staaken, July 29, 1927	216.107 KPH. 134.28 MPH.	Speed for 100 Kilometers (No Record)	
Speed for 500 Kilometers (Germany) Herman Steindorff, Rohrbach-Roland, 3 BMW, 230 H. P. ea., at Staaken, July 28, 1927	215.378 KPH. 133.828 MPH.	Speed for 500 Kilometers (No Record)	
Speed for 1,000 Kilometers (Germany) Herman Steindorff, Rohrbach-Roland, 3 BMW, 230 H. P. ea., at Staaken, July 28, 1927	214.855 KPH. 133.504 MPH.	Speed for 1,000 Kilometers (No Record)	

CLASS C—WITH USEFUL LOAD OF 5,000 KILOGRAMS (11,023.1 LBS.)
Returning to Point of Departure

Duration (France) L. Bossoutrot, Super Farman-Goliath, 4 Farman, 500 H. P. ea., at LeBourget, Nov. 16, 1925	1H. 12M. 21S.	Duration (No Record) Altitude (No Record)	
Altitude (France) L. Bossoutrot, Super Farman-Goliath, 4 Farman, 500 H. P. ea., at LeBourget, Nov. 16, 1925	3,586 Meters 11,765 Feet		

CLASS C—GREATEST PAY LOAD CARRIED TO AN ALTITUDE OF 2,000 METERS (6,671.7 FT.)

L. Bossoutrot, Super Farman-Goliath, 4 Farman, 500 H. P. ea., at LeBourget, Nov. 16, 1925	6,000 Kgs. 13,228 Lbs.	Lt. H. R. Harris, U. S. A. S., Barling Bomber, 6 Liberty, 400 H. P. ea., at Wilbur Wright Field, Dayton, O., Oct. 25, 1923	2,000 Kgs. 4,409 Lbs.

CLASS C—REFUELING IN FLIGHT
Returning to Point of Departure

Duration (United States) Lts. Smith and Richter, U. S. A., DH-4B, Liberty, 400 H. P., at Rockwell Field, San Diego, Cal., Aug. 27-28, 1923	37H. 15M. 14.8S.	Duration Lts. Smith and Richter, U. S. A. DH-4B, Liberty, 400 H. P., at Rockwell Field, San Diego, Cal., Aug. 27-28, 1923	37H. 15M. 14.8S.

RECORDS FOR LIGHT AIRPLANES
CLASS C—FIRST CATEGORY
Two Seaters Weigh Empty Less Than 400 Kgs.

Distance (Closed Circuit) (Czecho-Slovakia) Capt. Vaclav Vlcek and Capt. V. Charouseck, Avia B-9-4, Walter, 60 H. P., at Prague, July 26, 1927	600 Kilo. 372.8 Miles	Distance (Closed Circuit) (No Record) Distance (Airline) (No Record)	
Distance (Airline) (No Record)			
Altitude (Great Britain) Lady Bailey and Mrs. G. de Haviland D. H. Moth, Cirrus Mark 11, 30-80 H. P. at Stag Line, July 5, 1927	5,268 Meters 17,283 Feet	Altitude (No Record) Speed for 100 Kilometers (No Record)	
Speed for 100 Kilometers (Germany) Paul W. Baumer and F. Puls Baumer, Wright 60 H. P., Hamburg-Fuhlsbuttel, July 10, 1927	191.959 K. P. H. 119.276 M. P. H.		

LIGHT AIRPLANES
CLASS C—SECOND CATEGORY
Two Seaters Weigh Empty Less Than 200 Kgs.

Distance (Closed Circuit) (Hungary) Chas. Kaszala, Lanipich monoplane, Thorotzkai engine, 18 H. P. at Budapest, Sept. 14, 1927	650 Km. 403.9 Miles	Distance (Closed Circuit) (No Record)	

Official World and American Air Records

WORLD RECORD	AMERICAN RECORD
Distance (Airline) (No Record)	Distance (Airline) (No Record)
Altitude (No Record)	Altitude (No Record)
Speed for 100 Kilometers (No Record)	Speed for 100 Kilometers (No Record)

LIGHT AIRPLANES
CLASS C—THIRD CATEGORY
Single Seaters Weight Empty 200-400 Kgs., nc.

Distance (Closed Circuit) (France) Delmotte, Candron monoplane, Salmson 400 H. P. at Villacoublay, Aug. 28, 1927.. 1,535 Km. 953.1 Miles	Distance (Closed Circuits)
Distance (Airline) (Czecho Slovakia), Capt. Hamsik, Avia, Walter, 60 H. P., Prague-Reval, Sept. 9, 1927..... 1228 Km. 763.04 Miles	Distance (Airline) (No Record)
Altitude (Germany) Paul W. Baumer, Baumer, Wright, 60 H. P., Hamburg-Fuhlsbuttel, July 8, 1927.. 6,782 Meters 22,250 Feet	Altitude (No Record)
Speed for 100 Kilometers (Great Britain) Capt. H. S. Broad, D. H. "Tiger Moth," D. H. 32 engine, 130 H. P. at Stag Lane, Aug. 24, 1927..... 300.1 K. P. H. 186.47 M. P. H.	Speed for 100 Kilometers (No Record)

CLASS C²—SEAPLANES
Returning to Point of Departure Without Refueling

Duration (United States) Lts. C. H. Schildhauer and J. R. Kyle, U. S. N., U. S. Navy PN-9, 2 Packard 500 H. P., at Philadelphia, Pa., May 1-2, 1925 ..... 28H. 35 M. 27 S.	Duration Lts. C. H. Schildhauer and J. R. Kyle, U. S. N., U. S. Navy PN-9, 2 Packard 500 H. P., at Philadelphia, Pa., May 1-2, 1925 ..... 28H. 35M. 27S.
Distance (Germany) F. Loose, Junkers W-33, Junkers 320 H. P., at Aken, S-Elbe, March 29, 1927..... 1,702.8 Kt... 1,053.574 Miles	Distance* Lts. B. J. Connell and H. C. Rodd, PN-10 2 Packard, 600 H. P. each, at San Diego, Cal., Aug. 15-16, 1927..... 2,525 Km. 1,596 Miles
Distance (Airline) (United States) Comdr. John Rodgers, U. S. N., and Lt. B. J. Connell, PN-9, 2 Packard 1-A-1500, 500 H. P. ea., San Pablo Bay, Cal. to near Hawaii, Aug. 31,-Sept. 1, 1925..... 2,963 Km. 1,841 Statute Miles	Distance (Airline) Comdr. John Rodgers, U. S. N. and Lt. B. J. Connell, PN-9 2 Packard 1-A-1500, 500 H. P. each, San Pablo Bay, Cal. to near Hawaii, Aug. 31-Sept. 1, 1925..... 2,963 Km. 1,841 Statute Miles
Altitude (United States) Lt. C. C. Champion, U. S. N. Wright "Apache," Pratt & Whitney Wasp supercharged, 425 H. P., at Anacostia, D. C., July 4, 1927..... 11,581 Meters 37,995 Feet	Altitude Lt. C. C. Champion, U. S. N., Wright "Apache," Pratt & Whitney Wasp supercharged; 425 H. P., at Anacostia, D. C., July 4, 1927..... 11,581 Meters 37,995 Feet
Maximum Speed (Italy) Major Mario de Bernardi, Macchi, S 39, Fiat 800 H. P., at Hampton Roads, Norfolk, Va., Nov. 17, 1926..... 416.618 K. P. H. 258.873 M. P. H.	Maximum Straightaway Speed Lt. James H. Doolittle, U. S. A. S. Curtiss R3C-2 Curtis V-1400, 600 H. P., Bay Shore, Baltimore, Md., Oct. 27, 1925..... 395.439 K. P. H. 245.713 M. P. H.
Speed for Specified Distances	**Speed for Specified Distances**
Speed for 100 Kilometers (Italy) Maj. Mario de Bernardi, Macchi, S 39, Fiat 800 H. P., at Hampton Roads, Norfolk, Va., Nov. 17, 1926..... 399.423 K. P. H. 248.198 M. P. H.	Speed for 100 Kilometers Lt. James H. Doolittle, U. S. A. S., Curtiss R3C-2 Curtis V-1400, 600 H. P., Bay Shore, Baltimore, Md., Oct. 27, 1925..... 377.829 K. P. H. 234.772 M. P. H.
Speed for 500 Kilometers (United States) Lt. R. A. Ofstie, U. S. N., Curtiss Navy C-R, Seaplane, Curtiss D-12, 450 H. P., at Bay Shore, Baltimore, Md., Oct. 25, 1924 ..... 259.328 K. P. H. 161.14 M. P. H.	Speed for 500 Kilometers Lt. R. A. Ofstie, U. S. N., Curtiss Navy C-R, seaplane, Curtiss D-12, 450 H. P., at Bay Shore, Baltimore, Md., Oct. 25, 1924 ..... 259.328 K. P. H. 161.14 M. P. H.
Speed for 1,000 Kilometers (United States) Lt. R. Irvine, Vought "Corsair," Pratt & Whitney "Wasp," 425 H. P., at Hampton Roads, Va., May 21, 1927..... 210.716 K. P. H. 130.932 M. P. H.	Speed for 1,000 Kilometers Lt. R. Irvine, Vought "Corsair," Pratt & Whitney "Wasp," 425 H. P., at Hampton Roads, Va., May 21, 1927..... 210.716 K. P. H. 130.932 M. P. H.
Speed for 2,000 Kilometers (No Record)	Speed for 2,000 Kilometers* Lts. B. J. Connell and H. C. Rodd, U. S. N., PN-10, 2 Packard 600 H. P. ea., at San Diego, Cal., Aug. 15-16, 1927..... 126.567 K. P. H. 78.644 M. P. H.

Official World and American Air Records

CLASS C²—WITH USEFUL LOAD OF 500 KILOGRAMS (1,102.31 LBS.)

Returning to Point of Departure

WORLD RECORD		AMERICAN RECORD	
Duration (Germany) Fritz Loose, Junkers W-33, Junkers LV., 320 H. P., at Aken-S-Elbe, March 29, 1927....	14H. 9M. 2S	Duration* Lts. B. J. Connell and H. C. Rodd, U. S. N., PN-10, 2 Packard 600 H. P. ea., at San Diego, Cal., Aug. 15-16, 1927.....	20H. 45M. 40S.
Distance (Germany) Frits Loose, Junkers W-33, Junkers LV, 320 H. P., at Aken-S-Elbe, March 29, 1927	1,702.08 Km. 1,057.6 Miles	Distance* Lts. B. J. Connell and H. C. Rodd, U. S. N., PN-10, 2 Packard 600 H. P. ea., at San Diego, Cal., Aug. 15-16, 1927.....	2,525 Km. 1,569 Miles
Altitude (United States) Lt. Geo. R. Henderson, U. S. N., Vought "Corsair," Pratt & Whitney "Wasp," 425 H. P., at Washington, D. C., April 14, 1927	6,760 Meters 22,178 Feet	Altitude Lt. Geo. R. Henderson, U. S. N., Vought "Corsair," Pratt & Whitney "Wasp," 425 H. P., at Washington, D. C., April 14, 1927	6,760 Meters 22,178 Feet
Speed for 100 Kilometers (United States) Lt. S. W. Callaway, U. S. N., Vought "Corsair," Pratt & Whitney 425 H. P. "Wasp," at Hampton Roads, Va., April 23, 1927	236.998 K. P. H. 147.263 M. P. H.	Speed for 100 Kilometers Lt. S. W. Callaway, U. S. N., Vought "Corsair," Pratt & Whitney, 425 H. P. "Wasp," at Hampton Roads, Va., April 23, 1927	236.998 K. P. H. 147.263 M. P. H.
Speed for 500 Kilometers (United States) Lt. J. D. Barner, U. S. N., Vought "Corsair," Pratt & Whitney "Wasp" 425 H. P., at Hampton Roads, April 30, 1927.....	218.90 K. P. H. 136.023 M. P. H.	Speed for 500 Kilometers Lt. J. D. Barner, U. S. N., Vought "Corsair," Pratt & Whitney "Wasp," 425 H. P., at Hampton Roads, Va., April 30, 1927....	218.90 K. P. H. 136.023 M. P. H.
Speed for 1,000 Kilometers (Germany) Geo. Juterbock, Junkers W-34 Bristol Jupiter, 420 H. P., at Dessau, May 11, 1927	181.447 K. P. H. 112.695 M. P. H.	Speed for 1,000 Kilometers Lts. B. J. Connell and H. C. Rodd, U. S. N., N-10, 2 Packard 600 H. P. ea., at San Diego, Cal., Aug. 15-16, 1927.....	126.567 K. P. H. 78.644 M. P. H.
*F. A. I. Homologation pending.			
Speed for 2,000 Kilometers (No Record)		Speed for 2,000 Kilometers* Lts. B. J. Connell and H. C. Rodd, U. S. N., PN-10, 2 Packard, 600 H. P. ea., at San Diego, Cal., Aug. 15-16, 1927.....	126.567 K. P. H. 78.644 M. P. H.

CLASS C²—WITH USEFUL LOAD OF 1,000 KILOGRAMS (2,204.62 LBS.)

Returning to Point of Departure

Duration (United States) Lts. B. J. Connell and S. R. Pope, PN-10, 2 Packard, 600 H. P. ea., at San Diego, Cal., July 8, 1927.....	11H. 7M. 18S.	Duration Lt. Geo. R. Henderson, U. S. N., PN7-1, flying boat, 2 Wright T-2, 535 H. P., at Bay Shore, Baltimore, Md., Oct. 25, 1924..	5H. 28M. 43S.
Distance (United States) Lts. B. J. Connell and S. R. Pope, PN-10, 2 Packard, 600 H. P. ea., at San Diego, Cal., July 8, 1927.....	1,525.189 Km. 947.705 Miles	Distance Lt. Geo. R. Henderson, U. S. N., PN-7-1, flying boat, 2 Wright T-2, 535 H. P., at Bay Shore, Baltimore, Md., Oct. 25, 1924..	400 Km. 248.55 Miles
Altitude (Italy) M. A. Passaleva, Sacoia Marchetti S-55, 2 Isotta Fraschini engines, at Vigna di Valle, March 19, 1927.....	5,026 Meters 16,489 Feet	Altitude Lt. E. E. Dolecek, U. S. N., F-5-L, flying boat, 2 Liberty 400 H. P., at San Diego, Cal., June 7, 1923.....	2,432 Meters 7,979 Feet
Speed for 100 Kilometers (Germany) John Risctics, Junkers W-34, Jupiter 420 H. P., at Dessau, June 1, 1927.....	196.078 K. P. H. 121.836 M. P. H.	Speed for 100 Kilometers Lt. Geo. R. Henderson, U. S. N., PN-7-1, flying boat, 2 Wright T-2, 535 H. P. at Bay Shore, Baltimore, Md., Oct. 25, 1924..	126.345 K. P. H. 78.507 M. P. H.
Speed for 500 Kilometers (Italy) A. Passaleva, Savoia Marchetti, S-62, seaplane, 500 H. P., Isotta Fraschini, at Sesto Calende (Lac Majeur), Dec. 30, 1926.....	190.637 K. P. H. 118.455 M. P. H.	Speed for 500 Kilometers (No Record)	
Speed for 1,000 Kilometers (Sweden) K. G. Lindner, Junkers-Flygindustrie, 3 Junkers L5, 230 H. P. ea., at Limhamn-Kullen, Aug. 6, 1927.....	171.50 K. P. H. 106.50 M. P. H.	Speed for 1,000 Kilometers (No Record)	

Official World and American Air Records

RECORDS FOR LIGHT PLANES
CLASS C²—SEAPLANES—FIRST CATEGORY
Two Seater, Weight Empty Less Than 400 Kgs.

WORLD RECORDS		AMERICAN RECORDS	
Duration (United States) Lts. B. J. Connell and S. R. Pope, PN-10, 2 Packard, 600 H. P. ea., at San Diego, Cal., July 8, 1927	11H. 7M. 18S.	Duration Lt. O. B. Hardison, U. S. N., PN-7-2, flying boat, 2 Wright T-2, 535 H. P., at Bay Shore, Baltimore, Md., Oct. 25, 1924	1H. 49M. 11.9S.
Distance (United States) Lts. B. J. Connell and S. R. Pope, PN-10, 2 Packard, 600 H. P. ea., at San Diego, Cal., July 8, 1927	1,525.189 Km. 947.705 Miles	Distance Lt. O. B. Hardison, U. S. N., PN-7-2, flying boat, 2 Wright T-2, 535 H. P., at Bay Shore, Baltimore, Md	100 Km. 62.137 Miles
Altitude (France) Lt. de Vaisseau, Paris, C. A. M. S. 2 Jupiter-Gnome, 480 H. P. ea., at St. Paphaol, Aug. 18, 1927	4,684 Meters 7,538 Feet	Altitude* Lts. B. J. Connell and H. C. Rodd, PN-10, 2 Packard, 600 H. P. ea., at San Diego, Aug. 18, 1927	2,008 Meters 6,588 Feet
Speed for 100 Kilometers (Italy) A. Passaleva, Savoia Marchetti, S-55, 2 Isotta Fraschini, 500 H. P. ea., at Lac Majeur, Oct. 19, 1926	176.005 K. P. H. 109.361 M. P. H.	Speed for 100 Kilometers Lt. O. B. Hardison, U. S. N., PN-7-2, flying boat, 2 Wright T-2, 535 H. P., at Bay Shore, Baltimore, Md., Oct. 25, 1924	110.08 K. P. H. 68.4 M. P. H.
Speed for 500 Kilometers (Italy) A. Passaleva, Savoia Marchetti, S-55, 2 Isotta Fraschini, 500 H. P. ea., at Lac Majeur, Oct. 19, 1926	173.567 K. P. H. 107.849 M. P. H.	Speed for 500 Kilometers (No Record)	
Speed for 1,000 Kilometers (Italy) A. Passaleva, Savoia Marchetti, S-55, 2 Isotta Fraschini, 500 H. P. ea., at Cesto Calende, Lac Majeur, Dec. 23, 1926	166.363 K. P. H. 103.372 M. P. H.	Speed for 1,000 Kilometers (No Record)	

CLASS C²—SEAPLANES—GREATEST PAY LOAD CARRIED TO AN ALTITUDE OF 2,000 METERS (6,651.7 FT.)

A. Passalova, Savoia Marchetti, S-55, seaplane, 2 Isotta Fraschini, 500 H. P. ea., at Cesto Calende (Lac Majeur), Dec. 8, 1926	3,000 Kgs. 6,614 Lbs.	*Lts. B. J. Connell and H. C. Rodd, U. S. N., PN-10, 2 Packard, 600 H. P. ea., at San Diego, Cal., Aug. 18, 1927	3,504 Kgs. 7,726 Lbs.
Distance (Closed Circuit) (No Record)		Distance (Closed Circuit) (No Record)	
Distance (Airline) (No Record)		Distance (Airline) (No Record)	
Altitude (No Record)		Altitude (No Record)	
Speed for 100 Kilometers (No Record)		Speed for 100 Kilometers (No Record)	

LIGHT AIRPLANES
SECOND CATEGORY
Single Seaters, Weight Empty Less Than 200 Kgs.

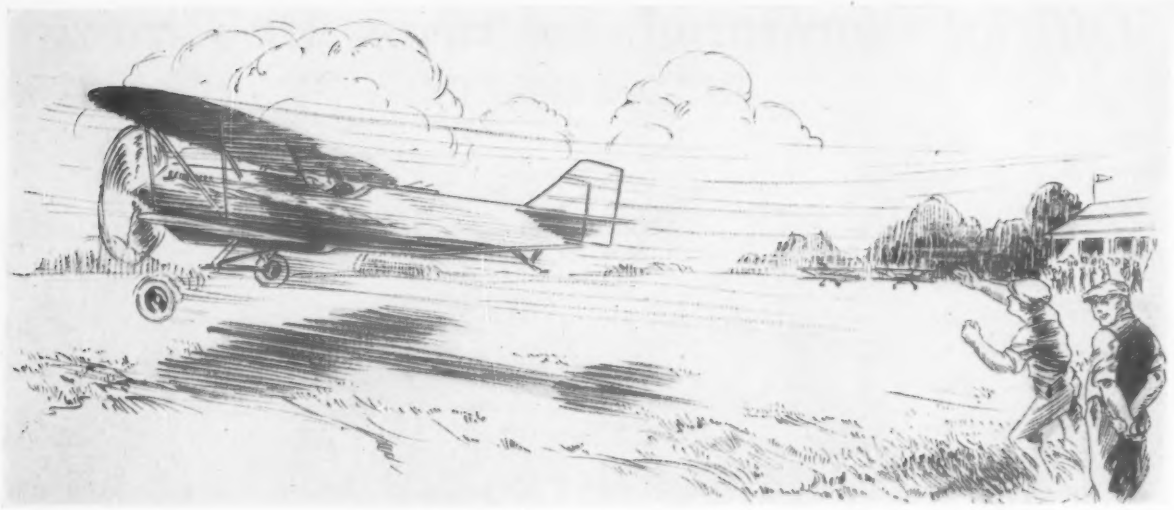
Distance (Closed Circuits) (No Record)	Distance (Closed Circuits) (No Record)
Distance (Airline) (No Record)	Distance (Airline) (No Record)
Altitude (No Record)	Altitude (No Record)
Speed for 100 Kilometers (No Record)	Speed for 100 Kilometers (No Record)

LIGHT AIRPLANES
THIRD CATEGORY
Single Seaters, Weight Empty 200-400 Kgs., Inc.

Distance (Closed Circuits) (No Record)	Distance (Closed Circuits) (No Record)
Distance (Airline) (No Record)	Distance (Airline) (No Record)
Altitude (No Record)	Altitude (No Record)

CLASS G—HELICOPTERS

Distance (Airline) (France) Pescara, Pescara Helicopter, 2 propellers, Hispano-Suiza, 180 H. P., at Issy-les-Moulineaux, April 18, 1924	Distance (Airline) (No Record) 736 Meters 2,414 Feet



Job Wanted

By Brock Mays

Jack Gurley strolled lazily around the end of the grandstand on the flying field at Texarkana, Texas, and paused to survey the ships of Gurley's Flying Circus, staked out in a neat line across the Western end of the runway. He was content. On the previous afternoon in a drizzling rain and low-hanging fog when, as Doc Horn had said, "even crows were walkin' home," one by one his gypsy birds of the air had found their way safely to their destination. And today, the day of Texarkana's annual Air Rodeo, had dawned fair and clear, and it seemed as if the Circus were certain to reach the pinnacle of its success. For the feature of the Rodeo was a one hundred and fifty mile free-for-all race with a prize of one thousand dollars! Passenger carrying; innumerable minor events with cash awards—things were looking up!

In San Antonio Jack had traded his time-worn SE-5 for a reconditioned Nieuport. Following Doc Horn's advice, he had clipped a few square feet of surface off the lower wings, and, as he later explained:

"Sure was a good trade. It can do anything that the SE-5 could; carries the sky-writing gear OK, and has the edge in speed over any commercial ship that we are apt to run across. Then, too, it has a come-hither howl that'll attract attention and drum up a lot of passengers in a hurry."

"Yea, bo," Doc replied. "And just for a starter we'll take that free-for-all over at Texarkana with one 'grand' hanging on the finish line!"

Jack suddenly started, unable to believe his eyes, then quickly made his way across the field. A short, red-haired stranger had cooly lifted the engine cover on the Nieuport, and was peering closely into the engine space.

"You have a world of nerve," Jack irately burst out, realizing that the slightest tampering might ruin their chances of vitcory.

"Sorry," the stranger returned with a smile. "I just couldn't resist the temptation to look her over. First rotary I've seen close up since I left France."

"Where were you in France?" Jack quickly asked, memories of those glorious days of war crowding in upon him.

"Hat-in-the-Ring; Eddie Rickenbacker's squadron; ninety-fourth pursuit."

"I was in the three hundred and forty-fourth," Jack responded. "The Armistice caught us at Brest." The stranger pulled the canvas cover into place with an expert hand, then queried diffidently:

"You don't need a good mech, do you?" Jack hesitated; for several weeks ago they had decided to add a mechanic to the pay-roll as soon as the opportunity presented itself.

"What experience have you had?"

"Nine years. . . . Army. . . . All types."

"Paid off, or over the hill?"

"Paid off."

"With that much service I'd think you'd have stuck it out."

"Well . . . I'll tell yuh. We had a flyin' top kick in my last outfit named Benson. My name is Wilkins. An' Benson an' I couldn't seem to agree. It was: 'Wilkins, sweep up the hangar; Wilkins, wash down the planes; Wilkins, bring in the tee; Wilkins, take out the tee; Wilkins, gas number seven; Wilkins, drain number eight.' I like work, but yuh'd a thought that every cock-eyed soldier in that squadron was named Wilkins. So when my time was up I presented Benson with a nice black-ringed souvenir around his right eye, and I'm not goin' back." Jack quickly made up his mind.

"You can lend us a hand today, and we'll decide later whether to make it permanent or not."

As the morning passed, Jack's satisfaction steadily increased. Ship after ship arrived at the field, and each one he mentally checked off as inferior to the Nieuport in speed. Passenger carrying went on apace, and, during the early afternoon, the first events on the program were run off without a hitch.

Suddenly the crowd was startled by a low drone to the westward, steadily increasing in volume! A small plane, emitting an awe-inspiring whine, dove past the grandstand at terrific speed, pulled straight up, did two rolls and a half, made a couple of graceful S-turns, and landed!

As the newly arrived pilot taxied to one end of the operating line, Jack instantly sized up the situation:

"Army pursuit job, markings covered over with water paint . . . D-12 engine, metal prop . . . speed one seventy-five. Some smart soldier wants that thousand berries, and, what's more, he'll get it." Momentarily he thought of protesting this entry, but at once realized the futility of such an act.

"Free-for-all . . . guess that lets him in. He'll swear it's his own ship, bought up after a crash and reconditioned; even if the judges knew it was an Army job, they probably wouldn't bar it out. The Nieuport will run a nice, easy second. . . . We can't beat the U. S. government."

The pursuit pilot strode towards the judges' stand, obviously making his entry in the free-for-all race. Jack noticed Wilkins moving around the Army plane, and suspicion dawned upon him.

"Probably friends," he muttered. Quickly he jerked the covers from the Nieuport, and gave the engine and controls a thorough going over. Finding nothing wrong, he called to Doc Horn. The latter swung the prop, and the instantaneous response of the engine showed it to be in perfect condition. Jack slowly ran it up to full power, noted the revs with approval, then cut the switch and clambered out of the cockpit.

"She's hitting pretty," he informed Doc. "Keep an eye on her until you are ready to take off. May as well show the crowd a nice race even if we haven't a chance to beat our unexpected friend. Fly low; drop your inside wing quite a little ways before you get to the pylons, then throw her on her side and pull around smooth . . . plenty of bottom rudder to keep from climbin'. . . ." Doc nodded his acquiescence and understanding.

Jack approvingly noticed that Wilkins was lending the Gurley ships a vigorous hand. As each one landed he helped the passengers out, or assisted new ones in; swung props; rustled gas, and made himself generally indispensable.

Finally the hour for the free-for-all arrived! The race being entirely against time, entries were started in succession. One by one the slower ships took off, circled, and dove across the starting line. At last Doc taxied the little Nieuport down the field, lifted his tail, and with the blast of the gun was in the air! Prettily he roared away down the course, overtaking the planes just ahead of him.

"He's sure flyin' sweet!" Doc had just rounded the home pylon with a sharp, hugging turn that lost not an inch of ground, and so smoothly made that his engine dropped not a single rev. Jack turned to find Wilkins at his side.

"How about that job?" the latter inquired.

"See me tonight," Jack replied, shortly, his suspicions still unallayed as to Wilkins' connection with the Army ship.

At the end of the line the D-12 started with a raucous roar! Friendly hands grasped a wing tip to aid in turning the high-powered plane towards the field. With a sharp burst of gun, rudder full over, the Army pilot started to taxi out. Jack suddenly grasped Wilkins' arm in sharp surprise! The outer wheel of the pursuit plane had come free of the axle, letting the wing-tip sag to the ground! The pilot cut the gun and quickly left his seat, searching in vain for the missing hub cap. Failing to find it, he cast his helmet down in futile rage, then quickly attempted to fit one borrowed from a near-by Jenny into place without success.

And overhead Doc Horn roared steadily on to victory! As the last plane finished and the judges announced the winner, Wilkins turned towards Jack Gurley.

"I managed to ease this off and slide the wheel out to the end of the axle while he was puttin' in his entry," he explained. In his hand he held a short, shining cylinder of machined aluminum!

"Guess I'd better go drop it where he will find it."

A few moments later one of the crowd around the disabled plane picked the missing hub cap from under his foot. It was promptly secured in place, and the Army ship soon roared disgustedly out of the field, homeward bound from a futile journey.

"Say, Wilkins," Jack suddenly queried, "do you know that pilot?"

"Sure," Wilkins answered. "That's Benson!"

"Big boy," Jack exclaimed, "You're hired!"

Customs Seize Plane

Customs officers made the first seizure of an aircraft ever recorded along the Canadian border by American officers when they picked up a seaplane piloted by W. H. Wincapaw of 126 Butler street, Staten Island, N. Y., that had come down on Lake Champlain owing to engine trouble after flying over the border from Canada. The pilot said the plane was owned by the Richmond Airways Company of Staten Island, and that he had been employed to carry Leon A. Tarr, who said he was a milliner of 1261 Broadway, New York, to Montreal. He said he did not know that he should have stopped and reported entrance to the United States. Engine trouble forced him down on Lake Champlain near Burlington, where he was picked up by lake patrolmen. Search of the craft failed to reveal any contraband, but seizure was ordered for crossing the border without reporting and is held as a suspected carrier of contraband. Wincapaw said he received eight dollars a flying hour for two trips he had made with Tarr, and that it took him eight hours to make the round trip. The Customs department was advised early during the summer that a plane had been making regular trips over the line, following Lake Champlain. Efforts to locate the New York base had been unsuccessful.

A few days later the seaplane was released on orders from Collector of Customs Harry C. Whitehill, following a report from customs officers that no contraband could be found either in the plane or the luggage. But customs officials made it plain that planes as well as motor cars or boats must stop on entering the country, to report, or else they will be subject to seizure or a penalty of $100 for each offence.

Current Comment

A Real Criticism

Emphasis, properly placed, is said to be a good thing, so we hammer home again the warning issued by Colonel Lindbergh, concerning half-trained pilots.

We are not directing this warning to the public, although the original warning was probably meant for them. Just a word to the "half-trained" men, themselves. Possibly the word is unfortunate, and "half-experienced" might have been a better selection. The best of training—and much of it is available—can never be a substitute for experience, for hours in the air. It is a wise provision of the Department of Commerce to set what seems to be a high minimum of solo hours for a license. A lowering of that minimum might result in the issuance of licenses to men who are not qualified for aircraft operation. A consequent increase in accidents would react most unfavorably against aviation and air transport. So, for the present, and until you have put in those hours, some way and by some sacrifice, you are helping to keep safety at its present high point.

No Scoffing

The decision of the German flyers, who seem to be interned at the Azores "for the duration" of the winter, not to attempt the hazardous trip to this continent will be hailed as a wise move. Nothing could be gained by leaving in the face of almost certain failure. This trip was undertaken by both seaplanes as a preliminary expedition to test the possibilities of the Azores route as a regular mail carrying route. The decision is good proof that as yet we do not know enough of ocean conditions, or have not the means to combat them, to render this route a practical one at all times of the year.

The Big Year

As we look back at 1927 and forward to the coming year, we wonder what events could happen to make another year as important to aviation, from every standpoint, as 1927. How about a non-stop, refueling-in-flight, trip around the world?

But, seriously, the linking-up of globe encircling air mail lines is not too fantastic a thing to expect in the near future. Practically speaking, New Zealand is a month away from us in point of letter time. Air mail service available in either direction will cut the time materially. Such service is available now directly across our continent and from the corners of Europe clear to the East Indies.

The ocean gaps, from the Americas to Europe and Africa, and from North America to Asia, are certain to be closed by some sort of rapid service. Possibly lighter-than-air ships will carry mails and express, possibly a combination of ship and plane service will be used. Time saving means so much in this complex day that speed always brings a money return.

Progress

The announcement that the passenger arrangements on the transcontinental route are considered inadequate and that larger ships with great capacity are to be placed in service comes very aptly at the present time. It is a definite proof that travellers are taking to the air for both speed and comfort. It is a justification of the vision of the men who planned and put into operation a great airline across difficult country.

Sounds Wonderful

We would like to know just how true is the newspaper story carried recently about the R-100, one of the two giant air liners being built by the British air ministry. Of course the cable despatches, which called this an air-liner, were interpreted by some newspapers to mean airplane instead of airship, and some of our dailies carried the astonishing news that a plane 700 feet by 130 feet would shortly wing its way across the Atlantic carrying 100 passengers.

We would like to see this type of air travel started, if for no other reason than the fact that the lighter-than-air ship will afford the finest possible means for an intensive study of meteorological conditions prevailing over the Atlantic. To our possibly limited editorial mind the success of trans-oceanic flight depends to a large extent on a more intimate knowledge of the atmospheric conditions of this great sea-sky space.

After all, air travel is air travel, and anything promoting it and making it more available and popular has our vote.

Current Comment

One for the Book

One of the operating transport companies has completed a million and a half miles of flying schedule in a year and a half. In that time they have had but one fatality—a pilot, not a passenger. Leaving out the remarkable fact that the company operated on schedule better than 95 per cent of the time, a fatality record of .67 per million miles is definite proof of careful operation and present-day safety.

The Aero Clubs

As predicted, nothing seems to stop the Aero Club movement. They are springing up all over the country, sometimes with the advantage of association with a national body and sometimes going it "independent." The idea is both right and sound, and deserves encouragement from both the manufacturer and the government.

Other governments encourage such clubs by giving them the use of planes, under certain wise restriction and regulations, sometimes instructors are furnished. Canada is building a body of civilian flyers who are not only emissaries of aviation, but form a nucleus for an arm of the national defense system. Soon this group will be more than a nucleus—it will be a branch in itself simply on account of the number of trained men that will be available.

Manufacturers who are conning the situation see in the clubs a great nursery of prospects. Of course the ambition of each club member is to have his own plane. The business is not only there but it is being made daily with every flight.

Thoughts, Foreign and Otherwise

Ordinarily it wearies us a trifle to hear the constant talk about the superiority of the European Air lines. They *are* good, and no mistake, and they produce business. Some of the advertising matter, such as posters and booklets, exhibit salesmanship of which we could be very proud. Some time we hope to reproduce some examples of European publicity.

But—we do get a laugh from the reply made by the head of one British company (made indignantly, we presume) to the charge that a majority of the travelers in the air were Americans. He stated with finality that 45 per cent of the travelers were British. Just what percentage were Americans is yet to be revealed. If Americans form such a bulk of passenger traffic abroad, what won't they do when the same service is offered them at home.

A Matter of Merchandising

We are told that today it is easy to sell an airplane. Schools, individuals, and businesses find it difficult to secure a plane without waiting for overtaxed factories to catch up on demand. Mass production will come—and soon—and we will enter an era of merchandising planes. Distribution through an organization of dealers, just as in the automobile business, will come simply because it is the logical development, and no city will be without competing aircraft distributors, handling planes in several price ranges.

We Grow

This month Popular Aviation increases its size by adding twenty-five per cent more pages. A more rapid increase in the advertising appearing in each issue than we expected has led us to make this step so that our readers may continue to receive a larger amount of reading matter. Flying weather may not be as good in the winter as in the other months, but reading weather is always with us. Summer may be the active time, but winter is the thoughtful period—the time when accomplishments are reviewed and plans are made. We look back on six months of a phenomenal growth that encourages us to make plans for the future that will enable us to keep pace in our progress with the progress of the industry with which we are allied heart and soul.

Just a Reminder *(Adv.)*

A subscription to Popular Aviation would make some air-minded friend of yours happy—and of course would never displease us. We can send it with the compliments of the holiday season.

Aviation Insurance

By Walter C. Crowdus

INSURANCE covering on several of the various classes of aviation was first written in Europe, the principal company being Lloyd's of London, who will gamble on most any insurance underwriting proposition. After the close of the World War—starting in 1919—there seemed to be a considerable demand in this country for aviation insurance, and several United States companies entered the field and undertook to write the business. These companies were of national reputation, but not one of them found the business to their liking—the losses exceeded the premium income, to say nothing of overhead, underwriting and acquisition expense. While the American companies were taking a trial at aviation insurance, Lloyd's of London, considering the American field a good one, sent over a United States representative, and since 1920 Lloyd's have been and still are covering the various hazards and risks of aviation.

It is not difficult to see where the trouble was—what was responsible for the heavy loss ratio. For several years immediately succeeding the close of the World War it was more or less a simple matter to secure coverage on any "ship"—it being only necessary to give a description of the plane and accompany the application with the pilot's statement. The skill and experience of the pilot, as indicated by his statement, was a somewhat important factor in determining the collision rate. There was practically no way, however, in which a real line was obtained on a pilot's ability as a flyer outside of his own statement.

It can thus be readily seen that in every case except that of a new plane the insurance company had very little exact knowledge as to the condition of the "ship" they were covering—they did not know whether the ship was really in good condition, frame work, fabric, wiring and motor—whether it was a flying egg crate, liable to fall apart or catch fire at any time. In the event of a loss on this type of plane, evidence having been destroyed, it was very difficult to ascertain the true condition before the crash or fire occurred.

The lack of inspection of planes and tests of pilots was to be regretted. Aircraft insurance companies were hard hit—rates went up and coverage was restricted.

It was only fair to place the blame where it really belonged—on the federal authorities. The government, which should have been the leader in aeronautical activities, made little or no attempt to regulate civilian and commercial flying. They did not inspect planes—any design of heavier than air craft, no matter how incorrect or radical, could attempt flights, and any individual, no matter how unskilled or inexperienced, could attempt to operate a flying machine—there was absolutely no licensing or regulation of pilots.

All this was in marked contrast to the manner in which aviation was regulated in Great Britain and on the continent. On the other side of the Atlantic all aircraft had to be examined at regular intervals by government inspectors. Before an individual was allowed to operate a plane he had to first pass a rigid examination and demonstrate his ability in an actual test flight. Ability to operate one make or type of aircraft did not entitle or allow a pilot to operate other makes or types. A separate license was required for each different "ship." Having once qualified, a pilot had to pass the same examination and test flight every six months—a check as to whether or not he had been "keeping his hand in" or lost any of the keenness of faculties and senses required for the safe operation of aircraft. These inspections and tests were made without reference to insurance. They were to safeguard the public and to decrease the number of aircraft accidents, thereby increasing confidence in aerial navigation as a mode to freight and passenger transportation.

Inspections and tests were made by both government officials and insurance underwriters. European aircraft underwriting companies, especially those in Britain, had made such an exhaustive study of the aeronautical situation and its many angles that in numerous cases the government bureaus accepted their reports and issued licenses based upon information and findings obtained and supplied by the underwriters. Close co-operation was maintained between government departments regulating aircraft and the underwriting companies, with the result that invaluable records

were compiled. It was a matter of interest to note that practically all British aircraft were insured. In the United States the reverse was true. In this connection it might be stated, however, that the bulk of "ships" flown in the United States during the years 1919 to 1921 had been of the "gypsy" variety—itinerant flyers—a most undesirable class of risk.

During 1919 inspection of aircraft and examination of pilot was suggested to American companies underwriting aircraft—same to be compulsory before the placing of protective coverage was considered. For some unknown reason this logical policy was disregarded and sidetracked.

In 1921, however, came action that had beneficial and far-reaching results —that helped establish commercial aviation on a sound basis. Insurance companies writing aircraft risks had finally come to their senses and started to use real underwriting principles.

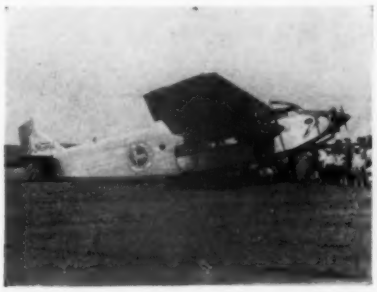
The National Aircraft Underwriters' Association was organized. The Underwriters' Laboratories opened a new department for aircraft. This department was conducted under the guidance of an old and well-known flyer, Major Randolph W. ("Shorty") Schroeder, at one time holder of the world's altitude record. The work of Schroeder's department of the Underwriters' Laboratories was to inspect and to register all planes which applied for insurance, also to examine and test the pilot or pilots who were to fly the insured plane.

Unless the plane had been inspected and registered by the aircraft department of the Underwriters' Laboratories and given a number, and unless the operating pilot had been tested and passed, insurance protection was not granted.

This policy of inspection by Schroeder and the Underwriters' Laboratories undoubtedly did reduce aviation accidents and, therefore, insurance losses and resulted in lower premium rates. The National Aircraft Underwriters' Association functioned for about two years, but apparently let down the bars towards the end and accepted risks in which the plane had not been registered nor given a certificate of air worthiness and in which the pilot had not been passed as acceptable. The ratio of insurance losses to business written has, however, shown a more or less steady decrease, due to several factors. Aircraft construction has greatly improved. Engines have become much more reliable. The number of landing fields throughout the country has increased many fold. The number of aviation schools has increased and the pilots which they are turning out have proven to be as a whole quite creditable.

As regards the construction of planes, the ever increasing use of metal has greatly reduced the fire hazard. The ever increasing number of hangars and their improved construction has also been responsible for lessened fire losses.

Accidents involving the public on the ground have decreased proportion-



ately, due to improved landing field facilities and to the fact that flying over congested areas has been prohibited by law and offenders punished.

Damage claims resulting from damage to property of others have decreased with the improved reliability of aviation motors. The ever increasing number of intermediate landing fields on the regular air mail routes has also been responsible for a decrease in the amount of damage claims payable to farmers an dstock raisers.

Claims resulting from theft or windstorm have maintained a more or less steady level. With the ever increasing number of pilots it would not be surprising to see the theft losses increase —every pilot is, of course, a potential airplane thief in the same way that every automobilist can steal a car if criminally inclined.

There is one class of aviation insurance risk which, however, has turned out to be very unprofitable. This is workmen's compensation, which the workmen's compensation acts of each state, with four exceptions, require the operators of aircraft to carry. Workmen's compensation protects the employees and the employees' families in the event that any employee is injured, maimed or killed while in the performance of his work.

The years through 1919 and 1926 have shown a steady tendency on the part of the insurance companies to broaden the coverage and to lower the rates. An example is the fact that in 1919 the fire insurance rate on the average plane was 6 per cent for six months, or the equivalent of 12 per cent annually. The present average fire insurance rate is about 4 per cent annually.

One of the greatest factors in safeguarding and developing American aviation, which we consider will eventually be responsible for making America "first in the air," is the interest which the government finally has taken. The establishment of the post of Assistant Secretary of Commerce for Aeronautics and the establishment in the Department of Commerce of an Aeronautical Director already is being felt. Assistant Secretary William P. MacCracken, Jr., faced a real man sized job when he stepped into the position. The air regulations have been a step in the right direction and changes and modifications are being constantly incorporated into them. The policy of the department has been that of obtaining the advice and co-operation of those interested in aeronautics before taking definite action.

The air regulations laying down the law, as it were, for the air-worthiness of aircraft and the ability of pilots have already been responsible for an improved situation in the aviation underwriting field. While the regulations in themselves only have authority to regulate inter-state flying—that is, flying in which aircraft crosses the state line—the spirit and intent of the regulations has been responsible for many cities, towns and counties adopting similar regulations and demanding practically identical degrees of planes' airworthiness and pilots' qualifications. The result, therefore, of the Department of Commerce air regulations has been to give American aviation a much more wholesome growth.

The improved conditions of American aviation have been directly reflected in Aviation insurance—more aviation insurance has been written and the loss ratio has shown a decrease.

The new Department of Commerce regulations and the manner in which they are being enforced has improved and will continue to improve the class of flying risks offered to the insurance companies. Licensed pilots are a known quantity under the new ap-

proved type certificates. Airplane manufacturers are turning out planes, the specifications of which have been approved by the Department of Commerce and are therefore of known airworthiness. Better planes and qualified pilots are making aviation safer.

Airplanes may be insured against the following hazards: Fire, Windstorm, Theft and Crash.

Operators and owners may be protected against claims on account of Public Liability, Passenger Liability, Property Damage and Workmen's Compensation.

Pilots, owners and others who fly, including passengers, may secure the following forms of protection: Life Insurance and Accident Insurance.

Fire Insurance is written in three forms as follows: Covering the plane under all circumstances. Fire insurance covering the plane only while on the ground. Fire insurance covering the plane during flight, attempted flight or landing and also while the engine is running immediately thereafter.

Windstorm, tornado or cyclone insurance covers the plane while on the ground.

Loss or damage occurring during flight or attempted flight is excluded. In the case of Seaplanes and Flying Boats the ship is not covered while it is moored. In either case a deduction of 5 per cent is made when settling claims.

Theft insurance covers any and all loss excluding the first $25 on instruments.

Crash insurance is written in three forms as follows: (1) Crash insurance with a clause deducting 10 per cent of the ship's value from the amount payable in the event of any kind of a loss. (2) Crash insurance with a clause deducting 15 per cent of the ship's value from the amount payable in the event of any kind of a loss. (3) Crash insurance with a clause deducting 20 per cent of the ship's value from the amount payable in the event of any kind of a loss.

Public liability insurance covers the owner's or operator's legal liability for claims for personal injuries to the public directly caused by the ownership, maintenance or use of the aircraft. Costs and expenses incurred with the consent of the Company are paid in addition to the amounts insured.

Property Damage insurance covers the owner's or operator's legal liability for damages on account of accidental damage to property (not belonging to the Insured, nor in the custody, nor in the control of the Insured, nor belonging to or in the custody or control of any of his employees, passengers, pupils or pilots, nor carried in or upon the aircraft of the Insured), directly caused by the ownership, maintenance or use of the aircraft.

The limits for which the assured desired to secure protection under Public Liability, Passenger Liability and Property Damage insurance may be chosen. The basic limits for Public Liability cover up to $5,000 for injury or death to one person and up to $10,000 for injury or death to two or more persons in any one accident. Higher limits of say $10,000/$20,000, $10,000/$30,000, etc., up to $50,000/$100,000 may be written at an additional premium charge.

Mechanics and ground crews are covered under Employer's Liability.

The basic limits for Passenger Liability are $1,000 coverage per each passenger seat. Higher limits may be written up to $25,000 per each passenger seat at additional premium.

The basic limits for Property Damage insurance are $1,000. Higher limits may be written up to $25,000.

Workmen's Compensation Insurance, as above discussed, protects the employees of the operator in the event that they are injured, maimed or killed while in the performance of their duties. It provides specific amounts for injuries, loss of sight or limbs and a specific amount payable to the employee's family in the event of death. The amounts of these indemnities are fixed by the Workmen's Compensation Acts of each of the States. It is compulsory under the State Law that manufacturers protect their employees with Workmen's Compensation Insurance. There are five principal classifications for aviation—private or commercial pilots, instructional, test and demonstrational pilots, photographers, hangar and field ground mechanics, airplane manufacturing. The rates are based on the payroll—so much per $100 annual remuneration.

There are certain exclusions applicable to each form of Aviation Insurance. In a way these exclusions are comparable to the exclusions under an automobile policy—they are as follows:

Loss or damage to wearing apparel or personal effects; or extra equipment not on the aircraft insured, unless specifically named in writing.

Loss or damage caused directly or indirectly by invasion, insurrection, riot, civil war or commotions, military, naval or usurped power, or by order of any civil authority.

Loss or damage incidental to the first flight (comprising a complete circuit in the air and alighting successfully without accident) of an aircraft after construction (reconstruction of material of the aircraft or parts thereof or in the type of engines used therein).

Loss or damage in respect of which any Government or State regulation for civil aviation is not complied with or while used for any illicit purpose.

Loss or damage occurring during the use of the aircraft for purposes other than those specified in attached Schedule of Warranties, or while the aircraft is being flown or driven by any person other than the person or persons named in said Schedule.

Loss or damage while the aircraft is left unattended in the open, unless the result of misadventure or unavoidable cause.

Loss or damage resulting from a land alighting aircraft alighting upon water or a seaplane or flying boat alighting upon or colliding with ice, land or objects upon land or shore, unless the result of misadventure or unavoidable cause.

Wear and tear, depreciation and gradual deterioration.

Loss or damage while aircraft is operated in any race or speed contest

(*Continued on page 80*)

Index of American Aircraft

The Waco-Ten Commercial

A three place biplane designed for general commercial flying, transport or pleasure by The Advance Aircraft Co., Troy, Ohio.

Specifications

General

Type	Open
Use	Commercial
Length, over all	23 ft. 3 in.
Height, over all	9 ft. 2 in.
Spread, over all	30 ft. 8 in.
Chord	62½ in.
Crew	1
Passengers (less pilot)	2
Control	Dual

Power

Make	Curtiss OX
Type	8 cyl.
Rated horsepower	90
R. P. M.	1,400
Cooling	Water

Wing Data

Curve	Aeromarine
Sweepback	None
Dihedral, upper wing	1°
Dihedral, lower wing	1°
Stagger	14 in.
Gap	4 ft. 11 in.
Angle of incidence, upper	2½
Angle of incidence, lower	2½
Spread, upper wing	30 ft. 8 in.
Spread, lower wing	29 ft. 4½ in.

Areas

Upper wing, including ailerons	147 ft. 35 in.
Lower wing, including ailerons	125 ft. 16 in.
Ailerons (4)	30 ft. 04 in.
Total wing area	272 ft.

Weight

Empty	1,199 lbs.
Fuel, gals.	37
Oil, gals.	4
Pay load	800 lbs.
Gross, ready to fly with load	variable

Performance

High speed	100 m.p.h.
Cruising speed	85-90 m.p.h.
Climb in first minute	1,000 ft.
Cruising range	4½ hrs.
Service ceiling (full load)	14,000 ft.

This page, and the other side, is the third of a complete series covering aircraft manufactured in the United States. Every month POPULAR AVIATION will publish the specifications of different aircraft in a standard form, and the entire series will afford you a master reference guide of the types and make of aircraft in the United States. The selection printed every month is chosen at random by POPULAR AVIATION and no attempt is made to publish the specifications in any order, alphabetical or otherwise.

Index of American Aircraft

Stinson-Detroiter Cabin Monoplane

A six-passenger cabin monoplane designed and manufactured by Stinson Aircraft Corp., Northville, Mich.

Specifications

General

Type	Cabin
Use	Commercial
Length, over all	32 ft.
Height, over all	8 ft. 3 in.
Span	45 ft. 10 in.
Chord	7 ft.
Crew	1
Passengers	5
Control	Dual-Deperdussin

Power

Type	Whirlwind
Make	Wright
Rated Horsepower	220
Cooling	Air
R. P. M.	1,850

Wing Data

Curve	Stinson
Sweepback	None
Dihedral	None
Angle of incidence	2°30′
Spread	45 ft. 10 in.

Areas

Area of wing, including ailerons	292 sq. ft.
Rudder	Balanced

Weight

Weight, empty	1,970 lbs.
Useful load	1,515 lbs.
Normal weight, fully loaded	3,485 lbs.

Performance

Power per horsepower, loaded	15.8 lbs.
Pounds per sq. ft., loaded	11.9 lbs.
High speed	128 m.p.h.
Cruising speed, approximately	105 m.p.h.
Climb in first minute, loaded	750 ft.
Service ceiling	14,000 ft.
Fuel capacity	90 gals.
Cruising range	600 miles
Landing speed at sea level	55 m.p.h.

This page, and the other side, is the third of a complete series covering aircraft manufactured in the United States. Every month POPULAR AVIATION will publish the specifications of different aircraft in a standard form, and the entire series will afford you a master reference guide of the types and make of aircraft in the United States. The selection printed every month is chosen at random by POPULAR AVIATION and no attempt is made to publish the specifications in any order, alphabetical or otherwise.

Absolutely Scientific and All That

By Our Own Designer

A. Roe Foyle, D.F. (Mex.), etc.

WITH everyone rushing into production on new type ships I figure it's up to me to finally uncover the works and come out into the open, and maybe even the air, with my latest design, I mean the one that is bound to revolutionize air traffic. I mean when it gets to be used. Of course, I mean after I get it to be made somewhere.

Now in case there are some readers who don't know me and are too polite to come right out and ask me "Who are you?," or even using impoliter words, I might as well state that I know my stuff. I have not only had several courses of instruction but I am a technical man. Figures and calculations come pretty easy to a man who's been keeping books for two years, and I've always maintained that the future of the industry is in the hands of the younger generation.

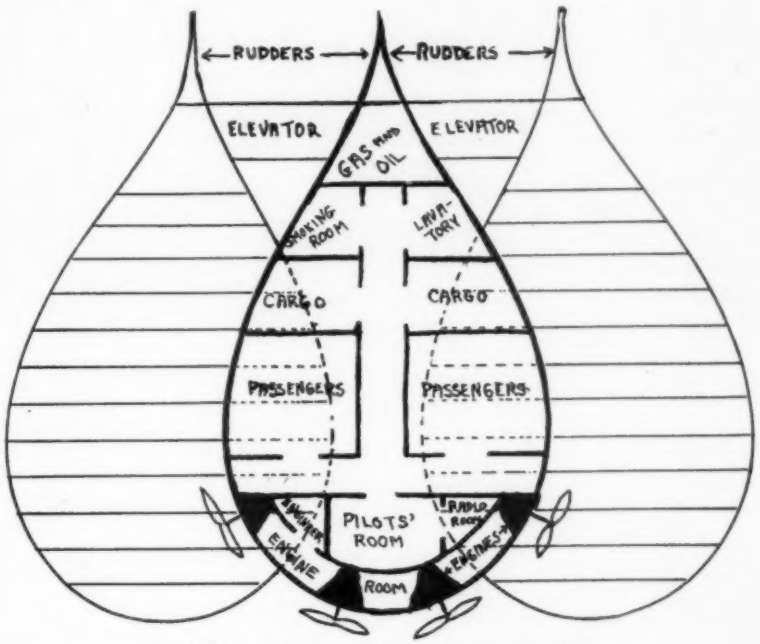
Besides that, I have had two questionnaires, or preliminary tests returned to me with a mark of 99 and the statement that the examiner had never before read a paper that showed a greater aptitude for flight. So you see I am right when I say I know my stuff.

Well, to get down to the revolutionary design. To a thinking man, it's really easy. As a matter of fact I didn't have to get up anything original at all, but simply adapt and especially improve some of the things that are used now. In that way, you see, I am able to prove, absolutely, that each feature will work.

The great advantage of that is in case some nitwit who thinks he knows the business starts objecting and says "That won't work," I can laugh it off and show him that it not only works on other planes but that I have improved it.

Now first of all, take the drawings of the new air-liner, Figure 1. I drew it up so you can look right down into the cabane. Easy, just by leaving out the drawing of part of each wing. Figure 2 shows a front view and that's how the wings are fastened to the cabane. Maybe I ought to explain that cabane is a technical word we designers use. It means cabin.

The first thing that ought to strike you is how simple it is, and how streamlined. You see, by adopting the simple but efficient lines of the common tadpole I have hit upon a natural streamlined shape, and you know nature can't be improved on. That is, not much, but I have done it a little. In fact when I showed my preliminary drawings to one man in the industry he looked at them a minute and then at me and said "Simple, I'll say so."



Looking down on it—kind of transparent like

Well, I have not only adopted a streamline shape for the cabane, but for the wings also. That certainly makes the air-liner more efficient and you can't deny it. One of the first principles is to keep away from resistance, and I've done it. I didn't show any landing gear because I've done away with it entirely. All these manufacturers have been trying to put wheels and floats on their aircraft. Just a hangover from the old days of ship building and motor cars.

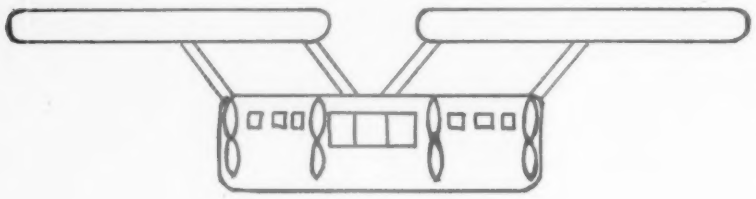
The shape is O. K. for sliding along the ground or the water, just like the old stone boats. You couldn't improve on them, and they had to carry real loads. Wheels are out, absolutely, and some of the builders will know it pretty soon. They're obsolete. Simple isn't it?

Now, look at the wings close and you'll see the next big feature. Slotted wings, and lots of slots. You know as well as I do that they work, only no one has had the gumption to give them a real trial. I have slotted the wings all over, just like a Venetian blind. That does away with ailerons, too, because the wing is practically all aileron. It means a saving in manufacturing, too.

The way it works, in case you can't right away grasp the magnitude of this improvement, is that you can open up both sides at once. That takes away all the lifting power and the machine will settle down almost vertically. I know this to be a fact, for I referred the matter to the same authority as before and asked him if it wouldn't settle down instead of gliding, and he said in these very words, "Settle? Absolutely, it will drop like a shot and won't glide an inch." That's proof, and commen-

dation, too. Well, that takes care of one of the great problems of the day, and that is landing in small fields.

To get out of small fields, all you have to do is to set the shutters at a steep angle and it will go up on a steep slant. This same authority told me when I asked him about its getting out of a small field, "Climb? Steep slant? Boy, if it climbs at all it will certainly climb straight up." So, that's taken care of O. K. To make it even better I added an extra large set of elevators, although I consider that as a concession to the manufacturers, who



Looking at It From the Front Side

are sold on the idea. I'm not, they're practically out of date now.

The interior of the cabane is divided off in a pretty clever way. Clear in the back is the oil and gas place, and I provided a regular smoking room right next to it. My consulting engineer, you know, the friend I spoke of, said "Absolutely, don't consider fire risk. I can guarantee your plane will never burn in the air." Now that's a pretty strong statement, but you can see what one man thinks of it. And he knows his business, too. You see, he has been connected with this manufacturing concern which is now interested in aircraft for seven years at least.

Then there's a lavatory, of course. In front of that are two large rooms for cargo. I didn't intend to have them in at first, but when I suggested to my consulting engineer that the space ought to bring in revenue and it would be nice to allow for it if possible, he said, "Go ahead, son, you won't lower the plane's lifting capacity by a single pound." With that encouragement I put them in. In one model I'm going to have a sort of steel strongroom like the liners have, for gold carrying, a real, business-getting feature.

In front of the cargo space, on each side of the corridor are two rooms for passengers. I haven't indicated the furniture, as one of the beauties of the plan is that the rooms can be fitted with chairs, benches, berths or what not. Even a piano, without sacrificing lift. (See above authority, who O. K.'s this idea, too.)

The pilot's room is right in the center of the front section, and provides regular controls for two men, and off to one side is a little radio room. Off to the other side is a little room for the engineer. I didn't intend to have this, but my consultant suggested it, and said there had to be some place for the engineer to go to get out of the noise. It's a kind of small room, like a cell, and it will be padded to keep out the noise. "Padded," said the above authority, "right and appropriate, too. With that little improvement, you can get just the right kind of engineer."

Now we come to the real works, and that's the engine room. One of the big features of this air-liner is its speed. Four hundred miles an hour, conservatively speaking. The way I figure is this: Any ordinary engine will make a plane go at least a hundred miles an hour, two engines, two hundred and so on up to four engines, four hundred miles an hour.

I said conservatively, but my chief engineer, who really knows the game (an expression we people in the business use when we mean the aircraft industry) says, "Why limit it to four hundred? Williams made over 300 with one engine." That's true, too, but I prefer to be low in my estimates.

The really big thing about the engines is the way they are mounted. They don't all face straight ahead because with my plan they are in a sort of semicircle and by running one or more of them faster you can turn the whole ship. I have made a rather deep study of this and I have taken care of the torque. That is a technical expression we designers use and it means twist or turn. So you see I can torque the ship O. K.

Just to show you how some people can think of the most insignificant things, one of the mechanics I was talking to asked me how I would synchronize the motors. As a matter of fact I hadn't given many of those little details a thought, as they can be worked out by the draughtsmen and builders, but I am not in favor of any of the high finishes, and instead of synchronizing the motors, the way you do motor cars, I think it would be more practical to rust proof them.

That is practically all. I didn't put any sizes on the drawings, as the beauty of these scientifically thought out plans is that once drawn to scale they can be increased practically to any size. I mean, of course, given motors large enough. As my expert engineer informs me, "Motors? Easy, all you have to do is order them, just the size and number you want. Everybody makes them." So that takes care of the motor situation and the size problem, too.

I had a little trouble with the name for this revolutionary model, but after a conference (that is a technical expression we use meaning a meeting) with the chief engineer of my proposed company, he suggested a very good name that met with my approval. "Bats," he said significantly, looking at me in a certain manner. "Sure enough," I replied, "I'll call it 'The Bat'." "Appropriate," said he. "Absolutely," I replied, "they certainly fly." "And how," said my chief advisory engineer.

Equator Flight Abandoned

The Navy Department practically has abandoned its plans for a round-the-world flight by the way of the equator, for the purpose of obtaining navigational data, according to Curtis D. Wilbur, Secretary of the Navy.

This project, Mr. Wilbur stated, has been given serious consideration by the Bureau of Aeronautics of the Department, and progressed as far as a "flight on paper." As far back as 1925 the Navy considered the practicability of making such a flight.

Although no definite reasons have been assigned for abandonment of the equatorial flight, it is believed that the transoceanic flights recently made have aided materially in the accumulation of air navigational information and that a flight around the world would hardly produce sufficient additional information to warrant the expense it would involve.

University of Pennsylvania Club

Scarcely more than a month ago, a small group of students at the University of Pennsylvania, Philadelphia, met one night in the room of a student and organized an aviation club. Eight young men attended the meeting.

Today, the University of Pennsylvania Aviation Club has a membership of ninety-five students—and new applications are still pouring in.

In the first month of its existence, the club made amazing strides, not only by increasing its membership many times over, but by securing the active co-operation of outstanding aeronautical experts and aviation enthusiasts in and near Philadelphia.

More important than that, the club has been responsible for setting in motion at the University of Pennsylvania well-defined plans for the inclusion of a course in commercial aviation in the University's curriculum. With the hearty assistance of Provost Josia H. Penniman, the club has aroused such an interest in aviation on the campus that Dr. George Wilson, a transportation expert on the faculty of the Wharton School of Commerce and Finance, U. of P., has been authorized to outline a comprehensive course in commercial aviation, details of which will be presented to University officials early next year.

To date, more than forty of the ninety-five club members have announced their willingness to take the course, and University authorities have assured club officials that the new study will be speedily aproved when it comes up for formal recommendation.

Edward E. Felker, of Beaver Springs, Pa., a student in the Wharton School, has been elected president of the Aviation Club; George C. Brown, of Memphis, Tenn., is vice-president; Edward J. Sweeney, of Atlantic City, is secretary, and John M. Diedrick, of Nanticoke, Pa., is treasurer. Brown has 360 hours of solo flying to his credit, another member of the club has 200 hours, and various other members have had flying experience.

The great majority of the members, however, have not flown a plane. Late in November the club chartered special busses and went to the Philadelphia Airport, where, under the direction of officials of the Ludington Philadelphia Flying Service, lessee of the airport, many of them were taken for their first airplane ride. Every member of the club made a flight during the afternoon in the Ludington company's Waco 9s and 10s.

The club expects to purchase a monoplane and hire a pilot for instruction purposes after they complete a basic ground course in aviation. They also expect to purchase a Ruggles Orientator and place it in a building on the campus to accustom themselves to the gyrations of flying.

"We are now trying to interest the Government sufficiently to have them establish a basic course of instruction in aviation in connection with the Reserve Officers Training Corps at the University of Pennsylvania," Mr. Felker explained. "Members of the unit could then go to the aviation camp held every summer at Langley Field, Va."

Outlining the club's purposes, Mr. Felker said the organization has five objectives in view.

"The first," he said, "is to arouse interest in the development of aviation among college students. That is our foremost aim. We also want to build up a library of aeronautical books and periodicals and place them in the University library.

"Another of our aims is to secure men of prominence in aeronautics and experts on aviation subjects address the club at its public meetings. The fourth purpose is to act as unit and do all we can for aviation both within and without our group. In this connection we have agreed to admit non-students to the club on an 'associate-member' basis.

"Our fifth aim is perhaps the one closest to most of the members' personal ambitions—to secure flying instruction on the ground and in the air under the tutelage of competent pilots. It is our belief that our club will aid in making college men 'air-minded,' and enable them, when they enter business or professional life, to give constructive aid to aviation as a whole.

"If this movement should spread among colleges—and it has a small but vigorous start now in perhaps half a dozen colleges throughout the country—the graduating members of the club could exert a considerable influence on future progress in aeronautics. Our club, for instance, would be quite willing to assist in the formation of new clubs in any other university and assist in having the movement assume greater importance and

become a real factor among those organizations doing their bit for the country's aviation future."

Some indication of the support accorded the University of Pennsylvania Aviation Club can be seen in the list of aviation officials and enthusiasts who have offered their assistance in assuring the new organization's success.

At a recent meeting of the club, the speakers included Hollinshead N. Taylor, vice-president of the National Aeronautic Association and chairman of the Aviation Committee, Philadel-

Edward E. Felker

phia Chamber of Commerce; Charles Townsend Ludington, a member of various national aviation committees, president of the Ludington Philadelphia Flying Service and second vice-president of National Air Transport; R. Sanford Saltus, Jr., vice-president of the Ludington organization; W. Lawrence LePage, assistant manager of Pitcairn Aviation, Inc. Major J. Sidney Owens, commander of the Twenty-eighth Division Air Service, Pennsylvania National Guard, and Lieutenant Earl J. Carpenter, Air Corps, U. S. Army, attached to the division as a flying instructor.

Colonel Charles A. Lindbergh has personally sponsored and endorsed the new club. It has the endorsement of other prominent trans-oceanic fliers. Meetings are held in Houston Hall, on the University campus, and once a week the club makes an inspection trip to nearby airports.

"The requirements for membership," said Mr. Felker, "are simple. We ask that the applicant show sufficient interest in aviation to warrant his membership in the club, but no technical experience is necessary. We also ask prospective members to make an oral or written report on some phase of aviation, or why he should be admitted to the club, or what he thinks the club membership would mean to him."

The club has communicated with the Harvard Flying Club, a three-year-old organization, and plans are being made to bring officials of that club to Philadelphia to speak before the University of Pennsylvania enthusiasts.

In the meantime, several members of the club are preparing for examinations as army aviation cadets. Among them is the club president, who expects to enter Brooks Field, San Antonio, Texas, next year, if he secures a passing grade in the next examination.

Gypsy Flyers Outlawed

Pennsylvania has declared war on gypsy fliers. Reckless pilots and their "crates" are to be outlawed.

One of the most important business matters being considered by the recently appointed State Aeronautics Commission is the drafting of rules and regulations to govern the state's aviators. A committee consisting of Commissioners Hollinshead N. Taylor, of Philadelphia; Edward N. Gott, of Bristol, and Howard Rigby, of Harrisburg, has been named to prepare regulations.

The committee will report its recommendations at the next meeting of the Commission. Robert M. Ginter, of Pittsburgh, secretary of the Commission, has been instructed to confer with the Department of Commerce, Washington, D. C., and secure data on Federal regulation of aviation. This information will be presented at the next Commission meeting and is expected to have a distinct bearing on the intra-state rules to be enforced in Pennsylvania.

According to Commissioner Taylor, who also is chairman of the Philadelphia Chamber of Commerce Aviation Committee, the Commission will grant state aviation licenses to pilots and pass on community applications for the establishment of airports. Each airport is to be licensed. The Commission has been empowered to revoke licenses for infractions or violations of state rules.

"One of the most important problems confronting the Commission," said Mr. Taylor, "is the elimination from Pennsylvania's aviation development of gypsy fliers who risk their own lives, those of their passengers, and those of spectators by flying crates fit only for the junk yard.

"The Commission's most important functions will be to encourage substantial aviation development, license pilots, provide for inspection of planes and encourage the establishment of airports."

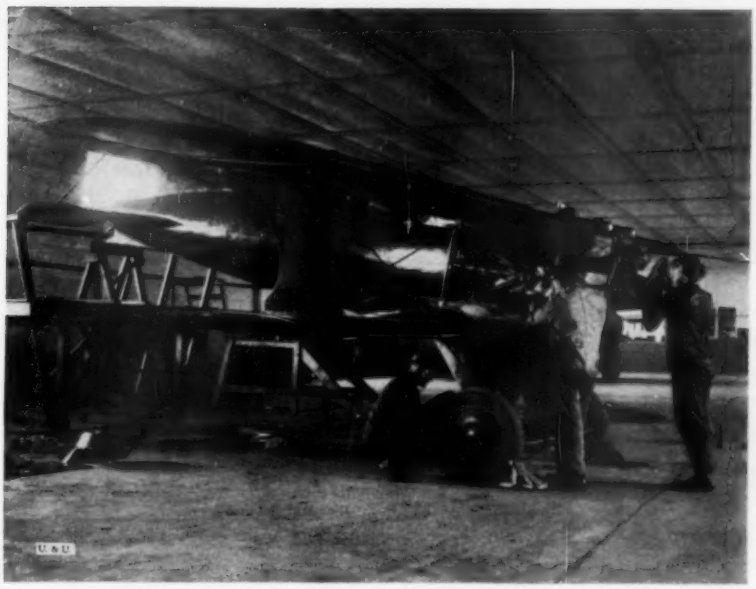
Commissioners Taylor, Gott and Rigby, James F. Woodward, Secretary of Internal Affairs for Pennsylvania; W. D. B. Ainey, chairman of the Public Service Commission; Major Charles J. Biddle, of Philadelphia, and Major J. Sydney Owens, commander of the 103rd Observation Squadron, Pennsylvania National Guard, comprise the Commission. A permanent chairman has not yet been selected.

Mr. Ginter, former Washington correspondent of the Pittsburgh Gazette-Times and at one time managing editor of that paper, has been named secretary of the Commission at a salary of $3,000 per year. The Commission's headquarters have been established at the State Capitol, Harrisburg.

Railway and Air Transport

The German Government Railway and the Deutsche Luft-Hansa have made an agreement to hold at least until Dec. 31, 1929, according to which the railways and the air transport are to co-operate for the express delivery of parcels. Thus, an express package may be mailed on the train at one of the smaller towns which have no airports as yet, shipped by express train to the nearest airport and then transferred directly to the airplane in waiting. By this arrangement a parcel could be shipped from Kottbus by rail to Berlin and then by airplane to Moscow.

New Speed Record



Lieut. Williams' flying engine fitted with landing gear for his record breaking speed burst.

LIEUTENANT ALFORD J. WILLIAMS, of the United States Navy, has unofficially broken the world's speed record by flying his specially built racer at 322.6 miles per hour. This is 455+ft. per second.

Comparing this to the record made with a seaplane in 1913 by M. Provost (France) in a Deperdussin monoplane, 160 h.p. Gnome which traveled 45.75 miles per hour, it is approximately a gain of 277 miles per hour in 14 years showing progress made experimenting in operation.

In 1914 C. H. Pixton (Great Britain) flying a Sopwith biplane with pontoons, using a 100 h.p. Gnome, flew 86.8 miles per hour. This shows an increase of almost 100% in a year.

Between 1914 and 1920, due to the war and the period of adjustment immediately after, there was a lull in contests and while semi-official recognition was given various officers' operations crediting their respective governments, it was not until 1920 that Luigi Bologna (Italy) in a Savoia S.19 boat with a 550 h.p. Ansaldo made 107 miles per hour.

In 1921 G. le Briganti (Italy) in a Macchi VII boat powered with a 200 h.p. Fraschini made 111 miles per hour.

The progress made between 1914 and 1922 was comparatively small for such a long period of operation, but in the meantime, because of the war, more attention had been paid to the lifting qualities and maneuverability of aircraft than to unusual speed, so that in 1922 we immediately see machines that have been built primarily for speed and a jump is made in the record of almost 40 miles per hour. This was demonstrated by H. C. Biard (Great Britain) in a Supermarine boat equipped with a 450 h.p. Napier "Lion," averaging a speed of 145.7 miles per hour.

While in 1923, Lieut. Rittenhouse of the United States Army, in a Curtiss C.R.3 biplane equipped with 465 h.p. Curtiss D-12 averaged 177.38 miles per hour over a 186 mile course and in 1925 at Baltimore, Lieut. J. Doolittle of the U. S. Army, flying a Curtiss Army R.3.C.2 biplane with a 510 h.p. Curtiss V-1400, averaged 232.57 miles per hour over a 188.86 mile course, which brought the Schneider Cup to this country in 1926.

Lieutenant Alford J. Williams, U. S. N.

At Newport Roads, over a 188.86 mile course, Major de Bernardi (Italy) in a Macchi M.39 monoplane equipped with an 800 h.p. Fiat, averaged 246.496 miles per hour.

In 1927 at the Schneider Races the speed averaged was 281.54 miles per hour, the winner being Flight-Lieut. Webster, flying a Supermarine S.5 equipped with a geared Napier engine, which broke all previous world's records and there is no doubt that if Lieut. Williams could have had his machine tested and ready for the Schneider Cup Races, he might have carried home the Schneider Cup, at least he would have made a very creditable showing for the United States, although the speed of 322.6 recorded unofficially was made without pontoons over a land course.

In Great Britain and Italy, the government have sponsored this type of flying and the United States government, when they have sponsored such a movement, have either captured the mark or at least have given the opponents a run for their money and by virtue of the effort, the designers and engineers of these machines have unquestionably learned something that could be used to advantage in designing and building fast aircraft for defense purpose.

Phone For Passenger Rates

Air-Mail Schedules

AIRWAYS

Air Travel Information

Air-Express Schedules

† Express
*† Express and Passenger
Light face type —A. M.
Bold face type —P. M.

Express Mail — *New York to — NATIONAL AIR TRANSPORT — Chicago, 726 Miles*

Westbound	Close P. O. Day	Close P. O. Nite	Leave Day	Leave Nite	Phone
New York, N. Y.	10:00	6:30	11:00	8:00	Lexington 8044
New Brunswick, N. J.	12:10	9:30	12:15	9:35	Nev. 4045
Cleveland, Ohio	3:35	1:35	3:35	1:30	Lakewood 9006
Chicago, Ill.			7:00	5:35	Harrison 8234

Eastbound	Close P. O. Day	Close P. O. Nite	Leave Day	Leave Nite	Phone
Chicago, Ill.	6:30	6:30	8:00	8:00	{ Austin 6248 { Harrison 8234
Cleveland, Ohio	11:17	11:30	12:15	12:15	Lakewood 9006
News Brunswick, N. J.			4:45	4:45	Nev. 4045
New York, N. Y.			7:00	6:15	Lexington 8044

Passenger Express Mail — *Chicago to — BOEING AIR TRANSPORT — San Francisco, 1943 Miles*

Westbound	Close P. O.	Leave	Phone
Chicago	6:30	7:50	Wabash 8084
Iowa City, Iowa	8:40	9:40	425
Des Moines, Iowa			Maple 707W
Omaha, Nebr.	10:30	12:35	Atlantic 9301
North Platte, Nebr.		2:00	29
Cheyenne, Wyo.	3:30	4:45	656
Rock Springs, Wyo.	6:30	7:05	415J
Salt Lake City, Utah	9:00	10:50	Wasatch 5569-3321
Elko, Nev.	10:45	11:15	1553
Reno, Nev.	1:00	1:45	195
Sacramento, Calif.		2:45	
San Francisco, Calif.		Ar. 4:30	Kearny 2041

Eastbound	Close P. O.	Leave	Phone
San Francisco, Calif.	6:05	7:00	Kearny 2041
Sacramento, Calif.	8:15	7:45	
Reno, Nev.	10:00	9:00	195
Elko, Nev.	12:15	11:00	1553
Salt Lake City, Utah	3:00	3:05	Wasatch 5569-3321
Rock Springs, Wyo.			415-J
Cheyenne, Wyo.	7:30	7:30	656
North Platte, Nebr.			29
Omaha, Nebr.	10:30	12:30	Atlantic 9301
Des Moines, Iowa		Deliver 1:30	Maple 707W
Iowa City, Iowa			425
Chicago, Ill.		Ar. 5:45	Hemlock 8180

Passenger Express Mail — *Chicago to — NATIONAL AIR TRANSPORT — Dallas, 989 Miles*

Southbound	Close P. O.	Leave	Phone
Chicago, Ill.	3:45	5:45	Harrison 8234
Moline, Ill.	6:50	7:20	Moline 738
St. Joseph, Mo.	10:10	10:20	St. Joe-6-0349
Kansas City, Mo.	10:50	11:18	Leeds 1090
Wichita, Kans.	12:45	1:18	Market 6185
Ponca City, Okla.	1:40	2:05	Ponca 9601-F2
Oklahoma City, Okla.	2:00	3:05	Walnut 4214
Fort Worth, Texas	4:00	5:15	Prospect 2169
Dallas, Texas		Ar. 5:35	5-7113

Northbound	Close P. O.	Leave	Phone
Dallas, Texas	7:00	7:45	5-7113
Fort Worth, Texas	7:00	8:15	Prospect 2169
Oklahoma City, Okla.	9:00	10:10	Walnut 4214
Ponca City, Okla.	10:40	11:05	Ponca 9601-F2
Wichita, Kans.	11:15	11:57	Market 6185
Kansas City, Mo.	12:15	2:05	Leeds 1090
St. Joseph, Mo.	2:17	2:40	St. Jos. 6-0349
Moline, Ill.	4.00	5:15	Moline 738
Chicago, Ill.		Ar. 7:20	Harrison 8234

Passenger Express Mail — *Chicago to — ROBERTSON AIRCRAFT CO. — St. Louis, 278 Miles*

Southbound	Close P. O.	Leave	Phone
Chicago, Ill.	5:20	5:50	Maywood 5010
Peoria, Ill.	6:55	7:25	Peoria 8195
Springfield, Ill.	7:45	8:15	Main 190
St. Louis, Mo.		Ar. 9:15	Avery 2725

Northbound	Close P. O.	Leave	Phone
St. Louis, Mo.	3:30	4:15	Avery 2725
Springfield, Ill.	4:50	5:20	Main 190
Peoria, Ill.	5:40	6:10	Peoria 8195
Chicago, Ill.		Ar. 7:30	

Passenger Express Mail — *Salt Lake City to— WESTERN AIR EXPRESS — Los Angeles, 600 Miles*

Westbound	Close P. O.	Leave	Phone
Salt Lake City, Utah	8:30	9:10	Wasatch 7023
Las Vegas, Nev.	2:10	2:25	Angeles 1786
Los Angeles, Calif.		Ar. 5:25	Trinity 6754

Eastbound	Close P. O.	Leave	Phone
Los Angeles, Calif.	6:30	7:35	Trinity 6754
Las Vegas, Nev.	9:50	10:40	Angeles 1786
Salt Lake City, Utah		Ar. 3:20	Wasatch 7023

Mail — *Salt Lake City to — * WALTER T. VARNEY — Pasco, 435 Miles*

Westbound	Close P. O.	Leave	Phone
Salt Lake City, Utah	9:00	10:00	Wasatch 5755
Boise, Ida.	Ar. 12:30	2:50	2901
Pasco, Wash.		6:00	31

Eastbound	Close P. O.	Leave	Phone
Pasco, Wash.		6:00	31
Boise, Ida.	9:00	9:20	2901
Salt Lake City, Utah		Ar. 12:50	Wasatch 5755

AIRWAYS—Continued

Passenger Express Mail — *Seattle to* — **PACIFIC AIR TRANSPORT** — *Los Angeles, 1,099 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Seattle, Wash.	11:20	11:45	Elliot 6698	Los Angeles, Calif.	11:20	12:01	Vermont 4279
Vancouver, Wash.	6:15			Bakersfield, Calif.	1:15	1:45	5655
Portland, Ore.		7:00		Fresno, Calif.	2:15	3:30	179-J-12
Medford, Ore.	9:00	9:30		San Francisco, Calif.	4:15	5:30	Douglas 3301
San Francisco, Calif.	12:25	1:15	Douglas 3301	Medford, Ore.	8:30	9:30	Walnut 4304
Fresno, Calif.	2:15	3:15		Portland, Ore.	11:15		241
Bakersfield, Calif.	3:50	4:45		Vancouver, Wash.		12:00	Vancouver 1307
Los Angeles, Calif.		Ar. 6:15	Vermont 4279	Seattle, Wash.		Ar. 2:00	

Mail — *Cheyenne to* — **COLORADO AIRWAYS** — *Pueblo, 199 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Cheyenne, Wyo.	4:10	5:30		Pueblo, Colo.	3:20	4:00	
Denver, Colo.	5:35	6:55		Colorado Springs, Colo.	3:30	4:50	
Colorado Springs, Colo.	6:30	7:50		Denver, Colo.	5:20	6:00	
Pueblo, Colo.		Ar. 8:30		Cheyenne, Wyo.		Ar. 7:30	

Passenger Express Mail — *Chicago to* — **NORTHWEST AIRWAYS** — *Minneapolis, 377 Miles*

Westbound	Close P. O.	Leave	Phone	Eastbound	Close P. O.	Leave	Phone
Chicago, Ill.		5:50		Minneapolis, Minn.	1:30	2:30	
Milwaukee, Wis.		6:50		St. Paul, Minn.	2:10	2:40	Cedar 5693
Madison, Wis.				La Crosse, Wis.	3:30	4:00	
La Crosse, Wis.		9:30		Madison, Wis.			
St. Paul, Minn.		11:30	Cedar 5693	Milwaukee, Wis.	5:15	6:00	
Minneapolis, Minn.		Ar. 11:40		Chicago, Ill.		Ar. 7:00	

Passenger Mail — *Boston to* — **COLONIAL AIR TRANSPORT** — *New York, 192 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Boston, Mass.	5:15	6:15	Hancock 4612	New York, N. Y.	3:00	6:00	Ashland 7750
Hartford, Conn.	6:15	7:35	2-9211	Hartford, Conn.		6:35	2-9211
New York, N. Y. (Hadley Field)		Ar. 9:15	Ashland 7750	Boston, Mass.		Ar. 8:05	Hancock 4612

Mail Freight — *Detroit to* — **FORD AIRLINES** — *Cleveland, 91 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Detroit, Mich.	9:10	10:40		Cleveland, Ohio	1:30	3:00	
Cleveland, Ohio		Ar. 12:10		Detroit, Mich.		4:30	

Mail Freight — *Detroit to* — **FORD AIRLINES** — *Chicago, 237 Miles*

Westbound	Close P. O.	Leave	Phone	Eastbound	Close P. O.	Leave	Phone
Detroit, Mich. (Central Time)	11:30	1:00		Chicago, Ill.	6:30	8:00	
Chicago, Ill.		3:00		Detroit, Mich.		Ar. 12:00	

Mail — *Cleveland to* — **CLIFFORD BALL AIRLINE** — *Pittsburgh, 123 Miles*

Southbound	Close P. O.	Leave	Phone	Northbound	Close P. O.	Leave	Phone
Cleveland, Ohio		12:15		Pittsburgh, Pa.		2:30	
Youngstown, Ohio		1:00		Youngstown, Ohio		3:15	
Pittsburgh, Pa.		Ar. 1:45		Cleveland, Ohio		Ar. 4:00	

Passenger — *Detroit to* — **STOUT AIR SERVICES** — *Cleveland, 91 Miles*

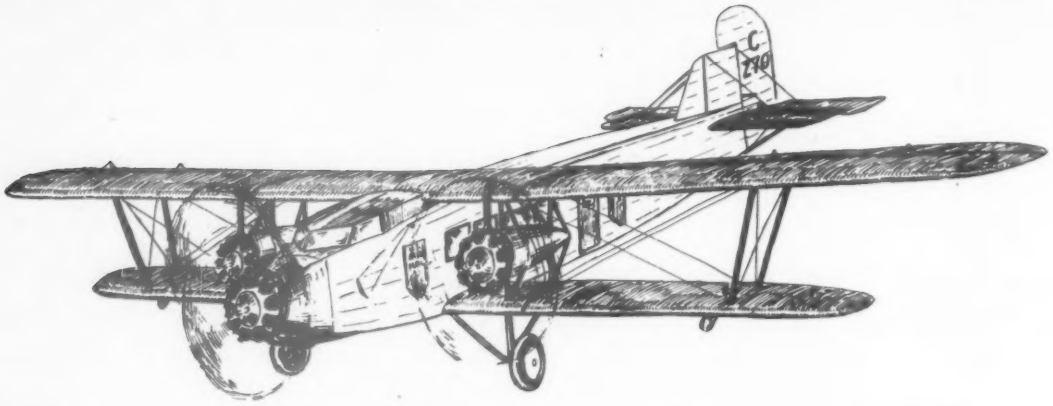
Southbound		Leave	Phone	Northbound		Leave	Phone
Detroit, Mich.		9:15	Clifford 0106	Cleveland, Ohio		9:15	Main 8833
Cleveland, Ohio		Ar. 10:55	Main 8833	Detroit, Mich.		Ar. 10:55	Clifford 0106
Detroit, Mich.		3:15	Clifford 0106	Cleveland, Ohio		3:15	Main 8833
Cleveland, Ohio		Ar. 4:55	Main 8833	Detroit, Mich.		Ar. 4:55	Clifford 0106

† Express
*† Express and Passenger
Light face type—A. M.
Bold face type—P. M.

Time used is local time, whether Eastern, Central, Mountain or Pacific.

*Walter T. Varney lines make train connections with Portland-Spokane-Tacoma-Seattle.

Incomplete data will be filled in as rapidly as authentic information can be compiled.



New Air Liners Being Built

THREE gaint 12-passenger airplanes, equipped with reclining chairs, luncheon buffet, and lavatory, and driven at the rate of 125 miles an hour by a triple-engine power plant of 1,275 horsepower, will go on the San Francisco-Chicago air mail and passenger line early next season, is the announcement made by W. G. Herron, vice president in charge of traffic for Boeing Air Transport, Inc.

Work on the three leviathans of the air is now under way at the plant of the Boeing Airplane Company of Seattle. The ships will cost $65,000 each, it is stated.

One of these ships, when fully loaded, will weigh 13,770 pounds, yet it will climb to 10,000 feet in 17 minutes. The wing spread is 80 feet from tip to tip, and the front propeller blades reach 14 feet and eight inches above the ground at the top of their swing.

Boeing Design, No. 80, as this new plane is designated, is a commercial airplane, powered with three Pratt and Whitney "Wasp" engines, designed to accommodate comfortably twelve passengers, and at the same time provide space for carrying 1,500 pounds of mail, express or baggage. The total normal pay load is taken as 3,700 pounds.

The Passenger's cabin is 73½ inches high, 63½ inches wide and approximately 14 feet long. Well upholstered seats, with reclining backs, are provided, there being one row of single seats on the left hand side of the cabin and a row of double seats with individual reclining backs on the other side. Large windows of safety glass, which are unobstructed by any part of the airplane structure, and which can be either partially or completely opened, are placed opposite each seat in the most convenient position for the passenger's vision. Forced ventilation and heating for the cabin is provided. The cabin is sound-proofed throughout. A convenient and comfortable toilet room is provided just aft of the main cabin.

Two baggage compartments are provided: one forward of the main cabin, with a capacity of 60 cubic feet; and one of equal capacity, just aft of the toilet room.

Three hundred forty gallons of fuel, in two tanks carried in the wings, permit of six hours cruising at 100 miles per hour.

In case of engine pump failure, the gasoline feeds all three engines by gravity in level flight.

Oil for each engine is carried in tanks in the respective engine sections. All engines are equipped with electric inertia starters, and a hand crank is provided in the event of failure of an electrical unit. All engines may be started from the pilot's cockpit. Adequate temperature control for each engine is provided. Controls are operated from pilot's cockpit. The wing engine mounts are removable and may be replaced by other units.

Single flight controls are provided, with a seat beside the pilot for a mechanic. The windshields are arranged so that either a closed or open cockpit is provided. Communication with the passengers' cabin is had by means of an aisle past the front baggage compartment.

Provision is made for complete night flying equipment, including two parachute flares.

The general characteristics of the airplane are as follows:

Total weight .....13,500 lbs.
Span, overall .....80 ft.
Length, overall .....56 ft.
Height (with front propeller turning) .....14 ft. 8 in.
Height (with all propellers horizontal) .....12 ft. 8 in.
Propellers—Standard Steel adjustable Dural blades. Diameter..10 ft.

PERFORMANCE—With Full Load —Three Engines

High speed at sea level....125 m.p.h.
High speed at 10,000 ft....118 m.p.h.
Landing speed—at sea level. 53 m.p.h.
Climb to 5,000 ft.....10 min.
Climb to 10,000 ft.....17 min.
Climbing speed at ground...84 m.p.h.
Service ceiling .....14,000 ft.

The airplane is designed and constructed to meet the load factors required by the U. S. Department of Commerce.

The wings are of steel and duralumin construction, the spars being of steel tubing. Drag bracing is of swaged wire. The external bracing is streamline duralumin struts and streamline wire.

The body is of steel and duralumin tubing and aft of the cockpit, steel tie rods are used for diagonal bracing. The covering is fabric.

The tail surfaces are of steel and duralumin tubing, fabric covered. The stabilizer is adjustable in flight from the pilot's cockpit. The front portion of the fin is also adjustable in flight to assist in control with an outboard motor dead.

The landing gear is of steel tubing. 44x10 wheels, with brakes, are provided, and the shock absorbing device is well-known Boeing oleo unit. The brakes are controllable either together or individually from the pilot's cockpit. The tailskid is a 15 in. wheel, with a steel tire 5 in. wide, which can move through 180 degrees to accommodate turning in a small radius by locking one landing gear wheel. A special Boeing oleo unit is provided for absorbing landing shocks.

This airplane is designed for a reliable, commercial carrier. Comfort for passengers is given first consideration, but the large cargo space provided in addition to the passenger cabin makes this airplane ideal for both types of pay load.

"These ships will be delivered early next summer," Mr. Herron said, "and will go on the route at once. We will begin with week-end sailings only, two ships leaving Chicago and San Francisco simultaneously. As increased business warrants, sailings will be increased to twice and three times a week, until eventually the large ships will sail daily. All mail, express, and passengers will be carried by the large ships on their sailing days, and the smaller planes now in use will take that day off."

The Ace of Shades

THE Morgan Company, Peoria, Ill., have acquired the distinction of being America's first paint and varnish manufacturer to recognize the airplane as an asset to its business and to purchase and operate a plane for the advertising of its products.

On August 17th, a standard model Air-King plane was delivered at Varney Field, Peoria, by the National Airways System, Lomax, Ill. A crew of painters was put to work with spray equipment and in less than two days the ship was completely finished in The Morgan Company's standard yellow and blue colors and lettered with its advertising. The company's name appears in large letters on the bottom side of the lower wing and its trademark and slogan on either side of the fuselage. On the rudder appears an enormous playing card, in the center of which is a reproduction of a labeled paint can. Above the can is the very appropriate name of the ship, "The Ace of Shades."

On Saturday, August 20th, in the presence of approximately eight hundred spectators, the ship was officially christened by the breaking of a vial of varnish over the propeller.

"The Ace of Shades" was purchased by The Morgan Company as an advertising agent and since its purchase it has visited more than twenty cities, in which the company has branches or distributors. Advance display advertising tells the local public of the ship's impending visit and states that miniature paper replicas of "The Ace of Shades," each bearing a number, will be dropped from the air. It is stated that certain of these numbers will entitle the finders to $2.50 each in gold and that the lucky numbers will be posted in the store window following the flight. Thus is the public interest secured in advance and a tie-up between The Morgan Company's products and their distributors secured.

In addition to the flying for advertising purposes, "The Ace of Shades" is also used by company executives for trips where time is a factor. Piloting the plane is Lieut. O. W. Young, U. S. R. C., who was, during the World War, an instructor in advanced stunt flying and, who has the additional advantage of being an experienced paint and varnish salesman.

A daily log is kept by the pilot, which shows the cities visited with distance between, number of hours flown, gas and oil consumption, location and condition of landing fields and a general summary of operations.

To handle the operation of the plane outside its own business, a separate company, known as The Morgan Aircraft Corporation, was formed with Elisha Morgan, President; C. H. Reid, Vice-President; E. L. Fritz, Secretary; R. N. Brons, Treasurer; and H. B. Sappington, Jr., General Manager.

The Morgan Company states that the publicity it has received to date is worth far over and above the amount of its investment and operating cost.

Flying Radio Station

The first flying radio broadcasting station has made its take-off. Flying Broadcasters, Inc., an organization of army and navy air reserve officers operating on the Pacific Coast, has been granted a license by the Federal Radio Commission to operate a transmitter from airplanes on the program broadcasting band. This is the first license issued for this purpose.

Experimentation in which Dr. J. H. Dellinger, of the U. S. Bureau of Standards, was a pioneer, has established the practicability of radio communication between air and earth. On one occasion Dr. Dellinger carried on a conversation from a plane flying over Washington with William P. MacCracken, Jr., Asst. Secretary of Commerce for Aeronautics, who was using the telephone in his office at the Commerce Department.

Model Airplane Construction

The Lefker Prize Model

By Joseph J. Lucas

All Rights Reserved by Illinois Model Aero Club

THE Lefker outdoor, hand-launched, duration record holder was designed by the writer and calculated and drawn up especially for Lack Lefker, who built and flew this model at the National Playground Miniature Aircraft Tournament at Memphis, October 8, 1927.

Jack Lefker, who is a member of the Illinois Model Areo Club, is only twelve years old, and he caused a sensation at the tournament by winning first place in the outdoor hand-launched contest and by setting a new junior duration record of 5 minutes and 37 seconds.

This model is a consistent flyer and is made in the standard design with the exception of the Lucas tail plane, which is inserted in the rear. The Lefker model is very light in weight due to the use of cans, bracing, single wire bearings, propeller shafts, elevator main frame, etc., which have been developed by the Illinois Model Areo Club in their sixteen years of designing, building and flying.

The Frame

The first part of the model to build is the A frame motor base with the tail plane inserted in the rear. The longerons are of balsa I sections, 39½ inches in length. They have a cross section of ⅜x⅜ inch with a thickness of flange and web of 1/16 and ⅛ inch respectively. The longerons are sandpapered very smooth and are doped with banana oil or airplane dope. The front wire hook is bent from piano wire, .035 inch, to the form as shown in the drawing of the front hook. They are ambroided and bound with fine silk thread to the nose of the frame.

Small balsa blocks are ambroided in place as shown in the drawing of the frame joint section. These balsa blocks are placed and perforated for inserting the bamboo as indicated in the drawing.

The two bamboo X braces are ⅛ inch x 1/32 inch. If these joints are made with ambroid and done carefully they will not require binding.

The next part of the frame to be made is the tail plane. The tail plane ribs, entering and trailing edges are made entirely of balsa wood. The entering edge is made from ¼x¼ inch wood, and the trailing edge from 5/16x 5/32 inch wood. Both are sandpapered very smooth to shape as shown in the drawing. They are then doped with banana oil or air plane dope.

The ribs, nine in number, are made exactly as shown in the drawing, with a thickness of 1/20 inch. These are also doped. The ribs are then spaced an inch apart between the entering and trailing edges and ambroided in place, leaving about an inch and a half open on each end of the tail plane.

Balsa blocks are now ambroided in between the I section longeron flanges, so that the perforations can be made 2¾ inches apart to have the entering and trailing edges of the tail plane to fit. Then the ends of the entering and trailing edges are inserted and ambroided in place like the braces. The ends projecting beyond the outside of the longerons can be cut off and sandpapered smooth.

Three cans on the outside of the frame longerons, which help the motor base to stand the pull of the rubbers, are put on with ambroid. They are placed as indicated in the drawing. These cans are bent to shape from piano wire, .035 inch, as shown in the drawing. The rear bearings or hangars, are bent to shape out of piano wire, same size, as shown and ambroided with a binding of silk thread to hold them in place.

The Main Plane

The main plane on the wing is the next thing to construct. The main wing is the important part of this model and great care must be taken when building it. The wing has a span of 32 inches and a chord of 4¾ inches. It is constructed of two balsa beams, one, the entering edge, 30x5/16x5/16 and the other, the trailing edge, 32x⅜x 3/32. Both of these beams are sandpapered smooth to shape as shown in the drawing and coated with banana oil or airplane dope. The beams are then cut in half.

The ribs, fifteen in number, are made of balsa wood of a thickness of 1/20 inch and cut to shape as shown in the drawing. Parts of the section of the ribs are then cut out for lightness as shown. They are then sandpapered and doped.

The front and rear wing beams are put together at the required dihedral angles as shown in the drawing. These beams are joined by two 1x1/32x1/32 pieces of bamboo, which are bent to the required dihedral angles as shown and then bound with ambroid or glue. The required dihedral angle can be checked by balancing the beams, after they are put together, at their centers on any level surface. If the ends of the beams are 1 inch above the surface the angle is correct.

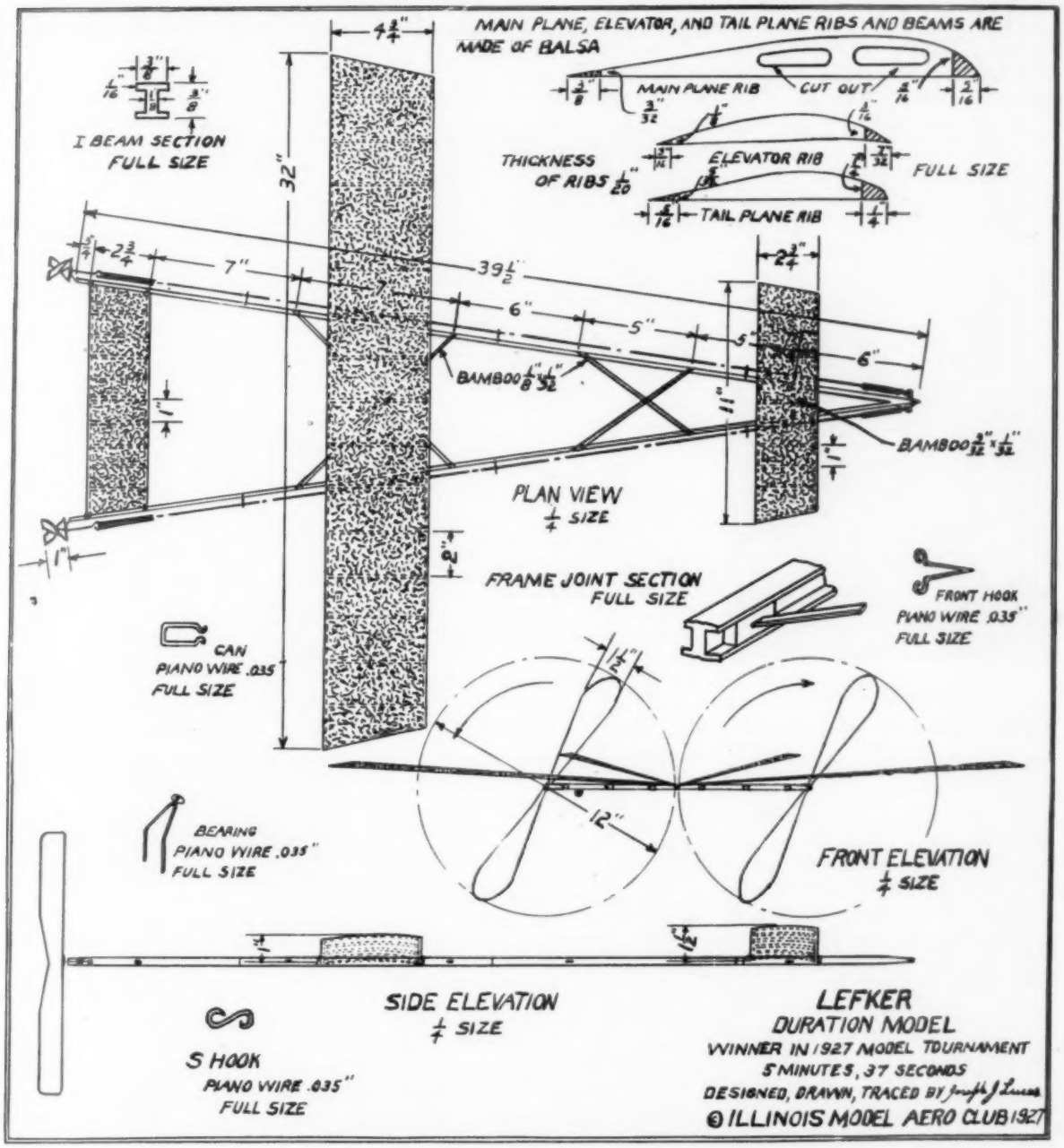
The next operation is to place the ribs two inches apart between the entering and trailing edges and to secure with ambroid or glue.

The wing tips are also of balsa wood and have the same section as the ribs, with the exception that the chord is somewhat greater so that the tips can be ambroided to the ends of the wing beams in the position shown in the drawing. The thickness of the wing tips should be 3/20 inch.

The Elevator

The elevator beams, ribs (nine in number) and tips are also made of balsa wood. The entering edge beam is 10x7/32x3/16 and the trailing edge beam is 11x3/16x⅛. The construction and assembly is the same as that of the main plane, except that the dihedral is 1½ inch, as shown in the

The Lefker Hand Launched Prize Model



drawing and the thickness of the elevator tips is 1/10 of an inch.

Covering

The tail plane, main plane and elevator are double-surfaced with Japanese silk tissue paper. A good method for gluing tissue paper is to apply banana oil. Cover the top first with the tissue, cementing with dope to the ribs and beams and drawing each section of the paper taut, particularly along the wing, rather than across it, in order to preserve the section. Then trim the paper off around the edges and dope the surface with a weak doping solution. Cover the bottom the same way as the top and also dope.

The Propellers

The propellers come next, and the success of model performance depends on how well they are made. The propellers are cut from 12x1½x1 balsa blanks. Diagonals are made on the 1½ inch faces from corner to corner and the blank is sawed along the outside of the lines, allowing enough for the hub at the intersection. Fine and true holes are drilled at the intersection for inserting the propeller shafts. The propellers are now ready to be carved.

When through carving see that they are perfectly balanced and if so, dope them. Bend the propeller shafts out of piano wire, .035 inch, into the

proper shape and insert them in the hubs with ambroid or glue. Then bend the ends over to anchor but do not indent the hubs. Be sure the shafts are ambroided securely and see that the shafts are true. Then put a few washers on the shaft for bearings. These propellers are the Wright true pitch type, and have a theorectical pitch of about 25 inches.

Joseph J. Lucas

For the required power to fly the model use eight strands of 3/16 flat rubber. If you follow instructions carefully and study the drawings on the model before starting the construction you will have no trouble either in building or flying this model.

When you come to fly this model don't forget that it is fragile and use great care in handling the motor stick. Stretch the rubber evenly and do not wind it up until the rubber is shorter than the motor stick. Keep the rubber in talcum or soapstone, it will last longer.

Illinois Model Aero Club

THE Illinois Model Aero Club was founded during January, 1912, to popularize and to study the science and art of aviation through the model airplane. This organization was one of the first model airplane clubs to be organized in the world, and it has advanced steadily while many other similar organizations formed later have fallen by the wayside. At present it is in its fifteenth year of successful operation.

Since the first model contest was held in 1912 up until the present time, the club now holds all of the world's records recognized for models of the rubber-driven type. In addition to holding these records the club is the permanent owner of the Villard Trophy as a result of having won the National Model Airplane Competition three consecutive times. The club won the Mulvihill Trophy for model airplanes the first three times it was offered for competition. The Illinois Model Aero Club has won all trophies offered for national competition. Below are the official world's records held by the Illinois Model Areo Club.

From these facts it is easily seen that the Illinois Model Aero Club has been very successful in its work, and it is their desire to continue this success by helping all who are interested in model flying or in aviation in general, and by popularizing this game throughout the world, and to bring it to as high a standard as possible and gain for it that high degree of respect and consideration which it deserves. There never was a mechanical field which held so much fascination for boys, not even the wireless craze, that model building and flying has not surpassed. There can be no doubt that all its effects are beneficial, not only to the brains and hands of the model builder, but to those leaders in the aviation world, who welcome everything suggested by model experimenters.

The Illinois Model Aero Club desires to help those boys who have attempted to build models but have had little success in getting them ot fly.

The outstanding fact that model flyers are potential leaders in the aircraft industry is born out by such outstanding characters as Grover C. Loening, and Asst. Sec. Warner of the Navy who were model flyers as boys years ago. The I. M. A. C. point with pride at E. M. Laird, the aircraft manufacturer of no mean ability and accomplishment, a charter member.

This model was broken by a spectator at the Memphis Tournament a moment after the photo was taken.

You are invited to attend the instruction meetings at which the construction of models will be explained. These meetings are held the first and third Friday evenings of each month, Club Room 132, Auditorium Hotel, Chicago, Ill.

YEAR	MODEL	KIND OF FLIGHT	TIME	DISTANCE	NAME
1924	Twin Push	Hand Launched Duration	10 Min. 14.2 Sec.		Robert Jaros
1924	Tractor	Hand Launched Duration	9 Min. 42.2 Sec.		Paul Shifler Smith
1921	Twin Push	Rise off Ground Duration	3 Min. 29.4 Sec.		Robert Jaros
1919	Tractor	Rise off Ground Duration	3 Min. 47.4 Sec.		P. Breckenridge
1921	Twin Push	Rise off Water Duration	2 Min. 52.0 Sec.		B. Pond
1922	Tractor	Rise off Water Duration	1 Min. 58.0 Sec.		B. Likosiak
1924	Twin Push	Hand Launched Distance		7,920 Ft.	Robert Jaros
1924	Tractor	Hand Launched Distance		6,024 Ft.	Paul Shifler Smith
1919	Twin Push	Rise off Ground Distance		4,029 Ft.	Wm. Schweitzer
1919	Tractor	Rise off Ground Distance		2,685 Ft.	P. Breckenridge
1921	Scale	Rise off Floor Indoor Duration	21 Sec.		Robert Jaros
1920	Twin Push	Hand Launched Speed	45 Miles per Hour	300 Ft	W. Wakin

The Scout Model

An Easy Model for Anyone to Build

By Bertram Pond

THIS model is known as "The Scout Model" because it was the design supplied to a troop of Indiana Boy Scouts who wanted to start model work with a simple indoor machine. They male a good showing with their ships and one of the boys hung up the enviable unofficial record of 117 seconds with his "Scout Model."

The Scouts found that the closer they adhered to the design specified the more success they had. It would be well to remember the experience of the Scouts when you build your model and use the dimensions and materials called for. The Model is just large enough not to be tedious. It is simple enough that a ten year old youth can build one. It will fly well enough to win prizes.

Here is a word from an old hand at model flying. When your model makes its first flight you will know this is a good suggestion and especially if you have brothers or sisters, dogs, etc., at home. The first thing to do is obtain or make a simple box of the following dimensions or larger: 4 in. deep, 5½ in. wide, 18½ in. long. This is to keep the parts and later the complete model from harm. Florists often have a handy size of box.

The only tools required are a good sharp pocket knife, a small round nose pliers, a wire cutter (5 in. Kraeuter diagonal cutter is recommended), a cheap marking gauge (wood with the nail sharpened flat like a dagger), a rule, a small soft brush, a hand-full of plain pins, and a small piece of fine and medium sandpaper.

Material List

1—Propeller blank, balsa 8½ in. x ⅝ in. x 1¼ in.
1—Motor stick, balsa 14 in. x ⅛ in. x ¼ in.
2—Wing beams, balsa 14½ in. x 3/32 in. x ⅛ in.
1—Strip bamboo.
1—Sheet paper, Japanese tissue.
1—Can "Ambroid" Cement, 2 oz.
1—Bottle Banana Oil, 2 oz.
1—Bearing.
No. 8 (.020 in.) music wire.
No. 6 (.016 in.) music wire.

Winding the Model.

Before starting this model, get out your November issue of POPULAR AVIATION and study the model section for helps and ideas.

We will now take up the construction and flying in the following steps:

1. Propeller.
2. Motor base.
3. Wing.
4. Assembling and flying.

1.—The *propeller* is laid out as follows, on a rectangular piece of medium weight balsa wood, 8½ in. long, ⅝ in. thick, 1¼ in. wide. (This gives a pitch of $8.5 \times 3.1416 \times \frac{1}{1.25} \times .625 = 13.4$ in.) First, true the blank to dimensions by sanding on a flat surface. Sand lightly for balsam sands off easily and can be quickly worked. Locate a small dot at the centers of the 8½ in. x 1¼ in. faces. Draw on one face only, a line 3/32 in. on each side of the center dot. (See drawing.) Hold a straight edge across the face of the block from corner to corner exactly. (Should be in line with center dot also.) With the point of a knife, cut a line along the straight edge about ⅛ in. deep along the four diagonals. Trim the blank and carve as shown in the drawing, leaving the center 3/16 in. thick as shown. Do not round the ends until the bottom side of the propeller is carved or you will have lost the geometrically accurate constant pitch which the layout gives you when you used the layout lines as guide lines in carving. The bottom should be flat or slightly concave except close to the center where it should be convex. Be careful and do not sandpaper away the edges. If necessary blacken or color the edges and then stay away religiously from them. When sanding near the edge, sand parallel to it. Nothing spoils the looks of a model more than a ragged or rough edge on the propeller.

Launching the Model.

Pare down the top or front side so that it tapers from the 3/16 in. hub to about 1/16 in. at the outer ends. Sand down to ⅛ in. hub and taper to about 3/64 in. at the ends, leaving the front edge or "entering edge" of the propeller slightly thicker and blunt to give that real propeller shape. A 9/16 in. radius will just about fit the ends and makes the best shape. We hope that you have kept the two halves symmetrical to each other. As the work advances, keep the balance point of the propeller close to the center dots. To do this, balance the propeller across your knife blade and lighten the heavy end of the propeller. Finish up the propeller by recessing the back side as shown on drawing, and fine sand to a careful balance. Then insert the propeller shaft from the back, bend a hook in front and ambroid it in place on both sides. True the shaft up a bit and we only need add a washer to complete the job. The drawing shows a right hand propeller (counter-clockwise rotation when viewed from front). Be sure to make it this way.

2.—The motor base is a simple part, yet it forms the backbone of the ship.

Use the marking gauge to cut the medium weight balsa motor stick down to accurate size. Smooth the edges with fine sandpaper. Cement the "can," rear hook, and bearing on true

Sergt. Kenneth A. Woolsey and his Curtiss Hawk pursuit model.

and securely. Assemble the bamboo splints (made by splitting the hard upper surface layer of bamboo down to size) to the frame as specified. The vertical fin is not made adjustable on our model as most of the turning effect is produced in the wing on this type. In papering, a silk thread can be strung around the "open" edges to fasten the paper to but if care is used in handling the model, the plain paper edge as cut with a razor will do the trick and make a neat looking job.

3.—"Wings" are our means of support so make a good one.

One plan used with considerable success is to make the parts and assemble the wing on a full scale drawing on cardboard so it can be held in place on the plan by small weights (coins, glue, can, etc.) or by wedging them down with crossed pins. They can be partly glued in this position, the pins removed, the glue cut loose from the form, and then the excess glue trimmed off the wing. Carefully glue the side that was against the form, being watchful not to loosen the top side again. However you assemble the wing, make the parts to the sizes shown on the drawing. For simplicity, the ends are made from 1/32 in. square straight bamboo splints. To get the wing beams to size, sand a balsa veneer down to 3/32 in. and with the specially sharpened marking gauge set to a shade over 1/8 in., cut them off, sanding smooth the guide edge a bit at each cut-off. Round the bottom side a little and taper slightly on each end. The bend in the wing (technically known as dihedral, or, the automatic pilot for our model) is easily obtained by either bending the beams by heat or steam or by making a joint using Ambroid. Ambroid the wing clips in place so that the motor base will be held at right angles to the wing. Before papering, the "torque" or twist must be set in the wing or at least partly so. The torque of the propeller must be absorbed by an extra lift on the right hand side of the wing. To do this, give the right front beam about 3/16 in. more rise than the rear beam in the assembly.

Cut a piece of paper about an inch larger than the wing. Starting at the center rib (after coating the top of the beams and ribs with banana oil) give a second swipe with banana oil and stick the paper to it. Then quickly wet the beams out to the first rib only for the oil dries quickly. With the thumb and first finger of both hands work the wrinkles out of the paper and stick it down. Cement all of the way out on both ends and trim off the paper margin. Now go back and give the wing clips a second helping of Ambroid and the wing is completed.

4.—Now you have built a model which, if instructions were religiously followed, will fly well for you; and make you feel like building some of the more scientific or more elaborate models which will appear on the pages of POPULAR AVIATION in future issues.

Now let us assemble the model and try its mettle.

First thread the propeller shaft around through the bearing. Tie a plain knot in the rubber motor, slip the rubber into the hook on the propeller shaft, run it back through the can with the knot to the rear. Then with the rubber in the "s" hook and hooked to the rear, there should be little slack or little tension in the new rubber. Balance the assembly on the finger.

For a trial glide, set the front edge of the wing about 1 in. in front of this balance, and slip the wing clips in place on the motor base as shown on the drawing. Now glide the model. Set the wing so that the model glides without stalling and porpoising or without dropping steeply on its nose. Give a look to the required extra incidence on the right side of the wing, and you are now ready for a trial flight!

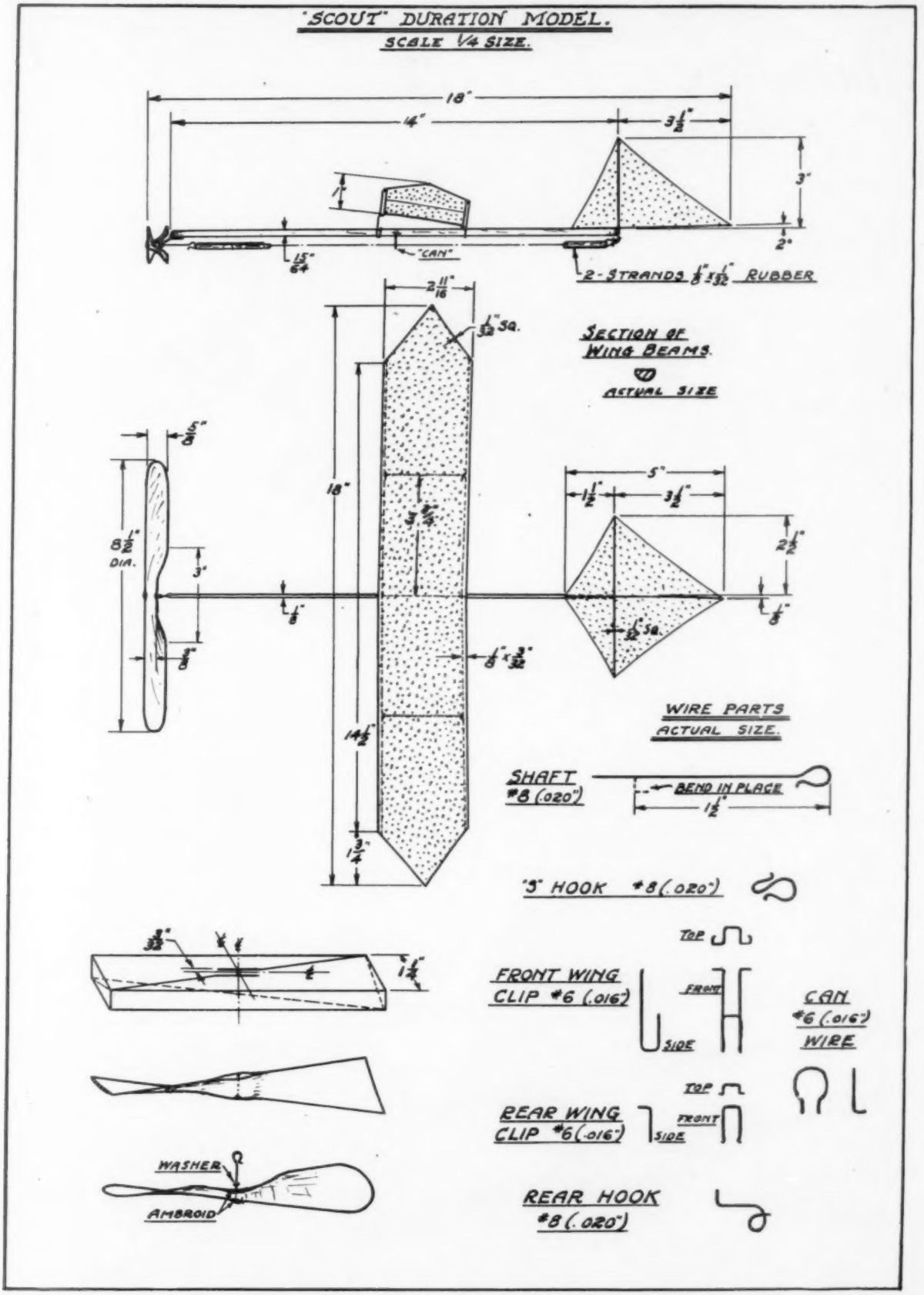
Wind her up about one hundred fifty turns, holding the model as shown in the "winding" picture. Launch the model with an easy toss on an even keel, holding it as shown in the "launching" photograph.

We'll let you have the fun of adjusting the model further. Study it out! They can be made to circle and climb until unwound and then, of course, they glide down. Write us about your models. Send a snapshot if you care to; and incidentally, tell us how you would like to build outdoor models, hydro models, scale models, gliders, etc.

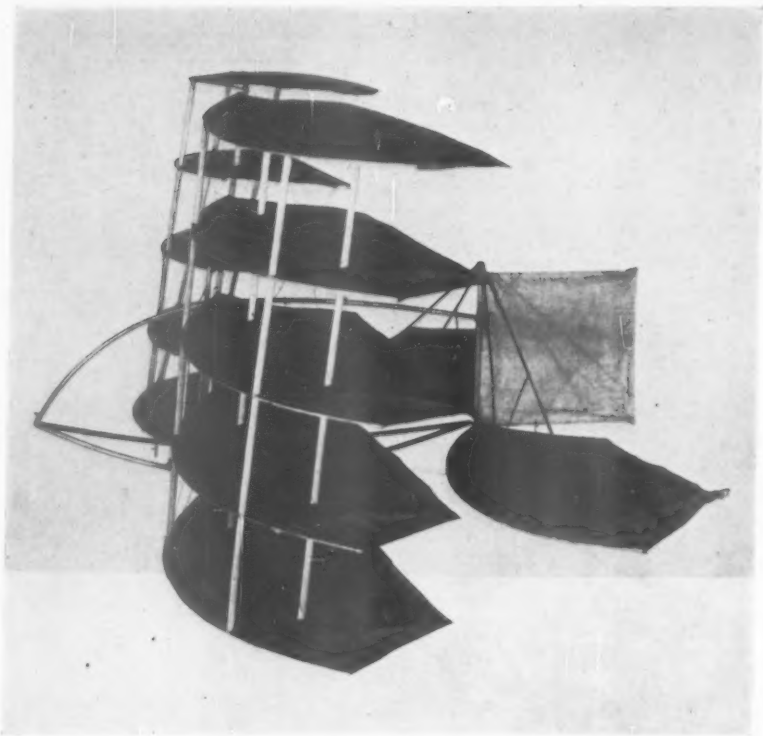
A Book on Models

The Boys' Book of Model Aeroplanes (The Century Co.)—With the country-wide interest in model building the revision of this popular work will be hailed by the coming generation of model builders. Starting as it does with the elementary principles of flight it takes up in detail the tools and material required, the theory and actual practice of construction and design.

One of the great helps to the serious student of model building is the chapter on scientific propeller building. For those who wish to form Model Aeroplane Clubs there is a constitution and set of by-laws that can be used as a guide in the organizing of the club.


"SCOUT" DURATION MODEL.
SCALE 1/4 SIZE.
18"
14"
3½"
3"
2"
1"
15/64
"CAN"
2-STRANDS 1/8" x 1/32" RUBBER
2 11/16
1/32" SQ.
SECTION OF WING BEAMS.
ACTUAL SIZE
5/8"
8½" DIA.
3"
1/8"
18"
3 5/8"
5"
1½"
3½"
2½"
1/32" SQ.
1/8" x 3/32"
14½"
1¾"
WIRE PARTS
ACTUAL SIZE.
SHAFT #8 (.020")
BEND IN PLACE
1½"
"J" HOOK #8 (.020")
3/32"
1¼"
TOP
FRONT WING CLIP #6 (.016")
FRONT
SIDE
CAN #6 (.016") WIRE
REAR WING CLIP #6 (.016")
WASHER
AMBROID
REAR HOOK #8 (.020")

Chanute's Original Models Found



Glider multiplane model by Octave Chanute, with movable main panel control. Side view.

IN a dusty, cobwebbed corner of the attic of the Chicago Academy of Science the original models of airplanes and gliders made by Octave Chanute were found only a few weeks ago.

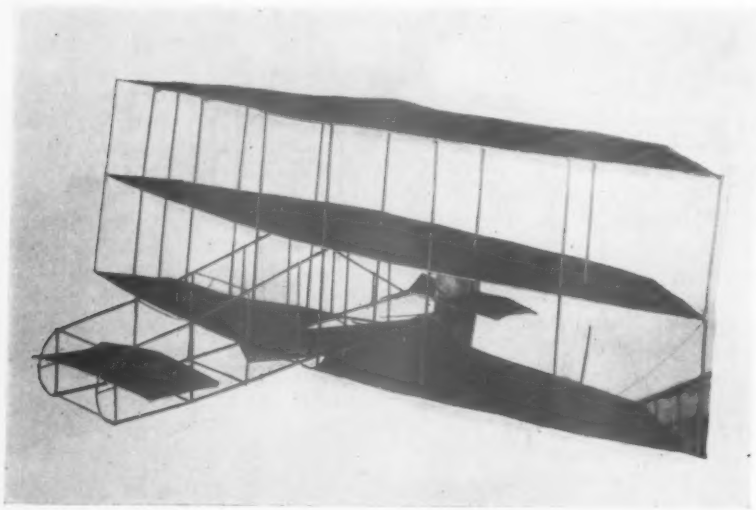
In 1910 Chanute's heirs presented the Academy with Chanute's models, and, lacking display space, the directors had them stored in their crates. As the years went on they were forgotten and the crates became covered with a miscellaneous assortment of rubbish.

It was not until a new director of the Academy, Dr. A. M. Bailey, made an inventory of the entire building that they were found. Learning of this find POPULAR AVIATION has taken steps to have the models preserved until it is possible to display them in the projected Rosenwald Industrial Museum.

Old friends of Octave Chanute remember seeing these models hanging from the ceiling of the library in his Chicago residence. They are beautifully made of bamboo and balloon silk, and show, in themselves, the path of Mr. Chanute's experiments.

In 1896 Chanute built man-carrying gliders on the pattern of these models, and carried on his experiments near Miller, Indiana, on the southern shore of Lake Michigan. Here, with the aid of a man, who is still living in a little Indiana town, he put his experiments to a practical test. Model after model was built and then rebuilt in larger form and tested out in the solitude of the dune country.

Glider triplane model by Octave Chanute with adjustable combination fore-and-aft controls.

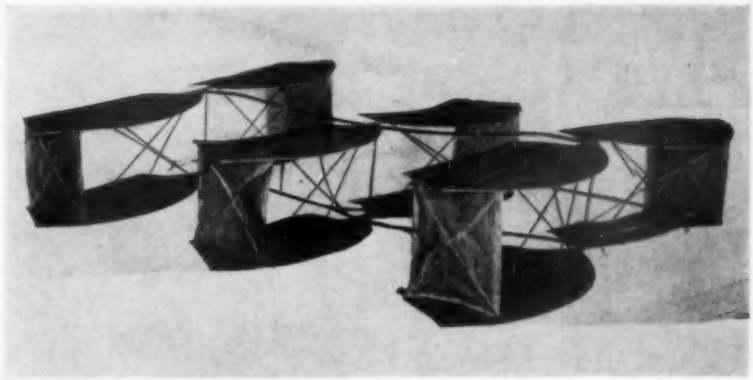


Chanute's various experiments convinced him that the biplane type of glider most nearly satisfied the requirements of securing "automatic stability at all angles of flight and conditions of wind."

In one of the models pictured here you can readily see that Mr. Chanute arrived at the general form of the airplane of today. He developed this type several years before the Wright Brothers flew their first airplane at Kitty Hawk.

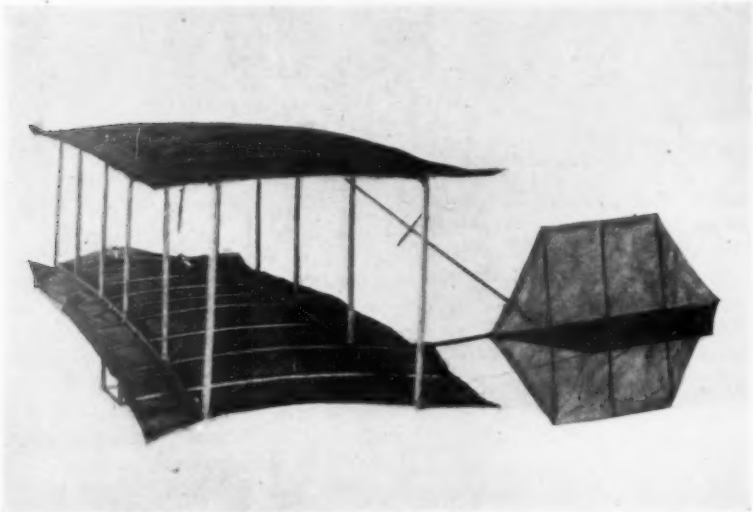
Some of the features developed by Chanute are worthy of special mention at this time. Take, for instance, the hinged device on one of the triplane models. This is a balanced rear tail and front elevator, so arranged that

Glider bi-multiplane model by Octave Chanute. One of the early experimental models. Three-quarters front view.



the assembly pivots, for vertical movement, on the plane framework.

It is fortunate that these models have been found and that steps are being taken to preserve them. Copies of some of them are to be found in the Smithsonian Institution, but the complete set will always have historic interest to those in the aircraft business.



Glider biplane model by Octave Chanute, the forerunner of the first power driven machines.

Navy Needs Flyers

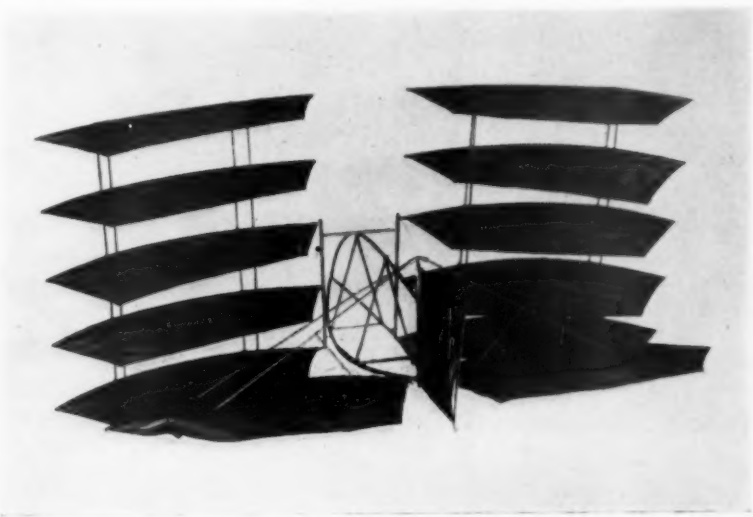
Lacking nearly half its quota of commissioned naval aviation, under the five-year air expansion program, the Navy Department has taken a definite step to increase the number of its flying officers. A letter has been dispatched to all ships and stations of the naval establishment, requesting information concerning the physical fitness for aviation training of all commissioned officers on the active list, who will have had two or more years' service on July 1, 1928. At present the Naval aviation branch has only 475 aviators, while the five-year program, now in its second year, calls for 863.

All officers meeting the service requirement, and who, in the annual physical examination of officers, are found without defects that would disqualify them for training at Pensacola, the Naval Air training school, will be directed to report for examination for aviation training. No officer will be ordered to instruction as pilot, however, unless he makes written application for it. No applications for training as aviation observer are desired.

Radio Flying Instruction

Co-Operating with Radio Station WGL, New York City, The ASPA has inaugurated a series of weekly radio lessons in aviation. Lt. Kelly, instructor of the Queens Aero Club and Lt. Heywang, of the Bronx Aero Club, impersonate the part of Lt. Wingskid the flight instructor and Cadet Dumbjohn, respectively. Listener-ins are advised to sit in a chair and arrange for an imaginary rudder bar and control stick. After explaining the parts and usage of parts of the airplane to the cadet Lt. Wingskid takes the cadet into the air and gives air instruction. Replies coming in to Station WGL indicates that many are following the series with great interest.

Glider multiplane model by Octave Chanute, with movable main panel control. Rear view.



Air Police

F. M. Williams, mayor of Anderson, Ind., Elmer Nighbert, chief of police, Leland Kaufman, rookie pilot, and Fred Parker, pilot with the Anderson Police Plane.

LAW enforcement officials are turning to the airplane as one means of checkmating criminals who use high powered automobiles for their "getaways." Pennsylvania is considering the use of planes for the rapid transport of officers of the State Constabulary and Indiana has made try-outs of this new pursuit method.

Captain Arman, of the Lafayette, Ind., police, was killed during a robbery of the Tippencanoe County Loan and Trust Company, recently. The county sheriff at Fort Meyers, Guy Emrick, received a telephone call from Lafayette advising him that the bandits were headed north in an automobile. Deputies were set to watch the roads, while the sheriff, with Attorney Robert A. Buhler, a local aviation enthusiast, took off in a plane piloted by Arch Alspach to make a survey of the surrounding country.

The plane enabled them to make a rapid inspection of all the roads about Fort Wayne and to assure themselves that the car wanted was not on any of them.

At Anderson, Indiana, an air police force has been formed for the same purpose, a plane being available for police use at all times, with a pilot and substitute pilot ready for call at any time.

Tracking bandits and murderers from the clouds, with aviation units comprising an important part of the Pennsylvania State Police organization, is under serious consideration in Pennsylvania.

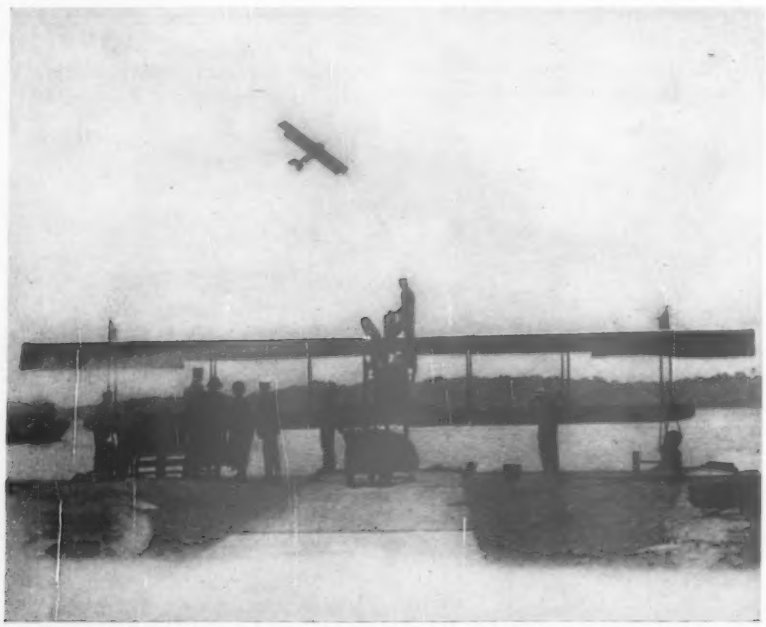
As soon as municipalities throughout the state develop community airports in sufficient numbers the State Police will do their scouting in airplanes, according to Major C. M. Wilhelm, deputy superintendent.

"Until municipal airports have been established over the State, use of the airplane in State-wide police work cannot be general," Major Wilhelm explained. "When landing fields have been established in close proximity to population centers, however, the airplane will be an important factor in the transportation of our troops."

Pennsylvania's new State Aeronautics Commission is considering plans of half a dozen cities to establish municipal airports, which will make feasible the constabulary's plan to get a flying start on fleeing criminals. A commercial flying company has placed planes at the disposal of the State Police organization for emergency cases when it is advisable to move a small squad of men from one section of the state to another in the quickest possible time.

In states as large as Pennsylvania, Major Wilhelm believes, aviation will be a formidable factor in fast transportation while tracking down criminals.

Police plane used in New York.



An A B C of Aviation

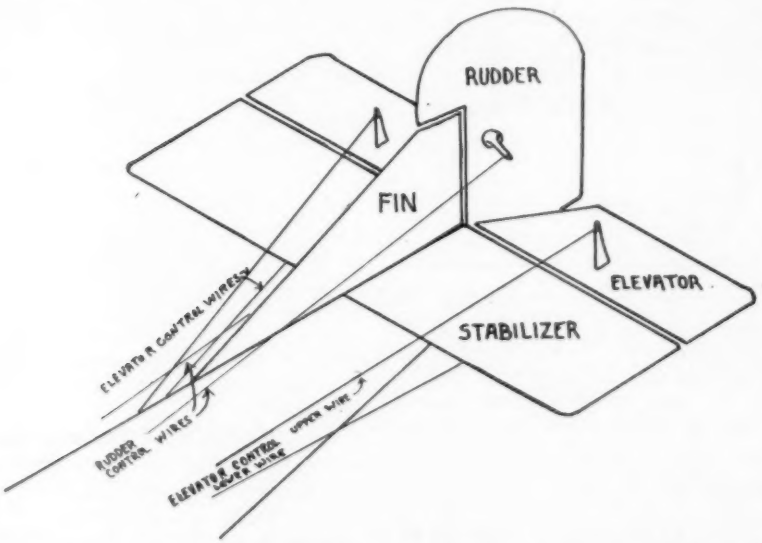
The Controls

THE controls of an airplane are decidedly simple, consisting of a set of controls for the engine and a set for the maneuvering of the plane itself.

The engine controls consist of a switch, a throttle, and a spark lever. These controls are too simple, and so much like those of an automobile that they need no explanation.

The controls proper, for the plane, consist of a rudder bar and a stick, as it is called. The rudder bar, or pedals, are foot operated while the stick is manually operated.

The stick control, erroneously called Joy-stick, is properly termed Joyce stick, and consists of a vertical bar, so mounted that the upper end, which is provided with a grip for the hand, can be moved in any direction from vertical. To the other end of the stick are attached the control wires leading to the ailerons and elevators.



Look at the illustration (p. 56, September) showing the axes of an airplane and you will readily understand the following explanations of the action of the controls.

The rudder causes a movement of the plane about the plane's "Z" or vertical axis. This is "yawing."

The forward or backward movement of the stick operates the elevators and causes the plane to move about its "Y" or lateral axis. This is called "pitching."

The side to side movement of the stick moves the ailerons and produces a movement of the airplane about the "X" or longitudinal axis. This movement is called "rolling."

The heavier types of planes utilize the Deperdussin control, which is a modification of the Joyce stick. This control, commonly called "Dep" control, is a post having only a forward and back movement, operating the elevators, precisely as the stick does. On this post or column is mounted, vertically, a wheel, like the steering wheel of an automobile. This wheel operates the ailerons.

It must be understood that the stick is so mounted on a universal joint that both the elevators and ailerons can be moved at the same time. In other words, a diagonal pull, or push, on the stick will operate the ailerons as well as the elevators. It does not take a separate movement to cause each separate action.

To the stick and the rudder bar, or pedals, are attached the wires which lead to the controlling surface affected. These surfaces are hinged to the main structure of the plane and to them are attached "horns" or projections, so that the pull of the control wire attached to the horn can move the surface. The horn supplies leverage.

The operation of the controls of a plane are natural and more or less instinctive, every movement of the hands and feet to preserve balance being a natural one.

It should be understood that the following explanations of the action of the various controls hold true only when the ship is in normal attitude. There are conditions, such as flying upside down, or in banks at a greater angle than 45 degrees, when the action of the controls is not the same. It is obvious, after a moment's thought, that if you are banking at an angle of nearly 90 degrees the elevator will be in the position of the rudder and will act like a rudder and vice versa.

First of all, pulling back on the stick raises the elevators. With the elevators raised the air pressure strikes the raised surface and forces the tail of the ship down. Naturally the pressure being exerted against the upper surface of the elevators the tail must be forced downward. The action is increased by the fact that the controls are located within the slipstream, which is that part of the air about a ship which is driven aft by the propeller. The slip stream has a greater velocity than the rest of the air about the plane and its effect on the control surfaces is to render them more sensitive. This movement causes the ship to climb.

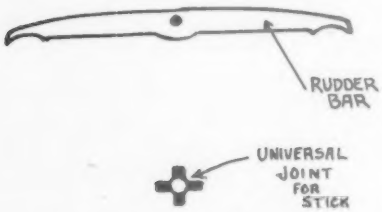
Pushing the stick forward depresses the elevators, which has the opposite effect, so the result is that the movement raises the tail of the ship, causing it to dive.

Moving the stick to the right drops the left aileron and raises the right aileron. The dropping of the left aileron increases the lift of this wing. Correspondingly, the raising of the right aileron decreases the lift of that wing. The result is that the airplane tilts to the right. Do not confuse this tilting with turning. The ship moves on its longitudinal axis.

Another result of applying right aileron, as this movement is called is

to turn the ship slightly to the left. This is caused by the fact that the depressed left aileron creates an additional drag on that wing, which tends to turn the ship.

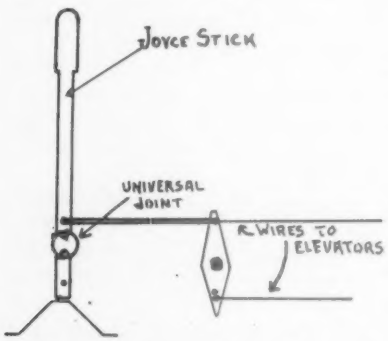
Left aileron—which is moving the stick to the left—results in a movement of the ship in the opposite direction.



The foot operated rudder acts in the identical fashion of a boat rudder. As long as the ship is level or not banking more than 45 degrees, pressure with the right foot swings the nose of the ship to the right. The force of the air striking the rudder surface at the tail of the ship swings the tail about, thus changing the direction.

Pressure with the left foot swings the nose of the ship to the left. Naturally the result is the opposite of right rudder.

The student should bear in mind that when the ship is banking at an angle of more than 45 degrees the rudder acts as an elevator, and that right rudder in a left bank of 45 or more degrees elevates the nose, but in a right bank it will depress it. The same applies, of course, to left rudder. In a left bank of more than 45 degrees left rudder depresses the nose



while it will elevate it in a right bank of more than 45 degrees.

Right rudder has a tendency to tilt the plane to the right, and left rudder has the opposite effect.

The student should keep in mind the fact that controls that operate normally during flying speed may operate only slightly or not at all at stalled flight. The operation of controls in stalled flight is a difficult subject to understand, as it really requires demonstration to bring home effectively the loss of effectiveness and the means employed to regain control.

One of the best ways to understand the action of the various controls is to show the various steps made in taking off.

Taking off is done against the wind whenever possible. The relative air speed is increased by the velocity of the wind so take-offs can be made with shorter runs against the wind.

As the ship gains speed it is held to a straight course by means of the rudder, using right or left as needed. At slow speeds the rudder is slow to act so rudder must be applied quickly and excessively.

As the engine is given "the gun" the stick is pushed forward to the limit. The effect of this is to raise the tail off the ground. However, as speed increases the stick must be brought back, as it will be found that the increased air speed keeps the tail off the ground and the ship in level flying position. If the stick is not gradually brought back to normal as the speed increases the nose of the plane will lower more and more and the ship may "nose over."

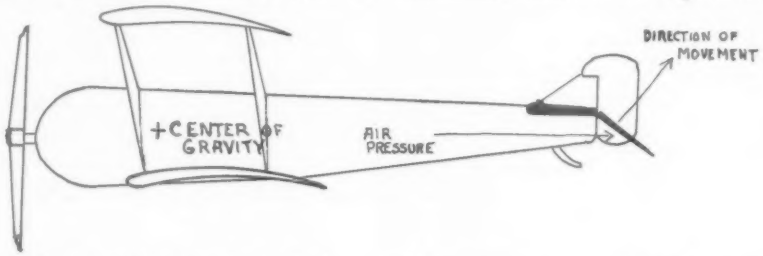


Diagram showing effect of elevators.

If the stick is brought back too soon the nose raises and the tail drops. This might result in slamming the tail of the ship back on the ground, with consequent strain and possibility of damage.

In taking off, three things are kept in mind by the pilot. He keeps the ship travelling in a straight line with the rudder. He keeps the ship level with the tail up in normal flying position by means of the elevators; and he keeps the wings level by means of the ailerons.

When flying speed is attained the ship seems to become lighter and the controls more sensitive. Finally the ship takes off, of itself, in a low angle climb. Experienced pilots, knowing both ship and conditions can practically drag a ship off the ground, but this is dangerous practice to the unexperienced, as there is a chance that the plane will stall when just off the ground.

Taking off requires almost instantaneous action with the controls and the student must "feel" the action and effectiveness of the controls increase as the ship gains speed.

World Airplane Census

The Department of Commerce now is planning to take a world census of airplanes. Its object is to determine the number and percentage of American make and others that are in service in foreign countries. While the Aeronautics Branch of the Department of Commerce is charged with fostering and regulating civil aeronautics in the United States, the function of the Department's Bureau of Foreign and Domestic Commerce is to promote export trade and the Automotive Division of that Bureau is planning to build up export business in American airplanes.

The census will be taken as of January 1, 1928, and will determine approximately the number of powered sea, land and amphibian planes in commercial use throughout the world, whether used for passenger or freight business, or a combination of the two services. Military equipment will be excluded. Consular and trade representatives of the U. S. Government in seventy foreign countries will receive the census questionnaire.

As many nations have subsidized aviation, the number of American planes in such countries is limited but the census is expected to reveal where the greatest potential foreign markets for American planes exist. With definite information at hand, the Automotive Division will follow through with a systematic program.

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News of the Airports

NEW YORK, our largest city, and the greatest port in the world, as well as the financial center of the world, is still without a public airport. Four different agencies are making surveys and investigating sites for a port, but as yet nothing has developed except bitter opposition of each faction to the selection of a site.

Naturally, every one agrees that the city should have a public airport, and everyone concedes the principle that the port should be located as near the city as possible. So far, the city of New York, the Port Authority of New York and New Jersey, the State of New York, and the Department of Commerce have each been looking for a site.

The problem is a comparatively simple one when stated in words devoid of all political bias. An ideal airport site is one which is close to a city's center and the post office and is large enough to accommodate the expected traffic. In other words, a stretch of level land sufficient for four or eight directional runways 2,000 feet long which is available at a price which will not be prohibitive.

Governor's Island seems to offer an almost ideal location. As a fortification it is practically useless today, as it is too close to the heart of the city. That very factor which makes it antiquated as a means of protection to the city makes it a good selection as an airport. It is large enough for the purpose and needs little work done to prepare it for use. At the present time some of the island is taken up with frame storehouses which could be razed with little trouble.

At the present time New York City is handicapped in taking advantage of air facilities by the fact that the available fields are so far from the heart of the city that, except in the case of long journeys, the time saved in using the air is wasted between landing fields and the city. As a matter of fact it does not pay to use the air transport available at New York unless the distance is greater than three hours' trip.

If the Governor's Island site is acquired the city will be assured of a port within fifteen minutes of downtown. The only drawback to the selection of the site is said to be opposition at Washington, or the placing of too high a price on the property by the Government.

Other sites under consideration, together with the motoring time from the Grand Central Station, are listed below:

Site.	Minutes.
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Rutland Airport

The Aeronautical Chamber of Commerce has received advices from the Rutland Chamber of Commerce, Rutland, Vermont, that the Rutland Airport completed November 15, is now ready to receive air traffic.

The field is marked by a 100 feet white circle and the name of the town is painted on the roof of a building north of the field. Wind cones are installed and runways are completed north and south 1,800 feet, and east and west 1,500 feet.

Notice of the above will be of interest to all aviators and also of great current interest, due to work in connection with flood relief.

Anderson Plans Airport

By spring, Anderson, Ind., will have a class AAA airport, if the plans of the local chamber of commerce mature. A large tract of land four miles from the center of the city has been selected and is now being prepared for use as a landing field. A paved road to the field is under construction at the present time.

The Chamber of Commerce has had the co-operation of the Orin Welch Aircraft Company, located at Anderson, in the planning and layout of the new airport. This company operates a flying school, having an enrollment at the present time of twenty-four students. Mr. Welch is the designer and builder of a three-place cabin monoplane and a new type biplane. Production on these ships is expected shortly after the Department of Commerce approves the stress analysis now being made.

News of the Airports

So many cities have requested technical advice with regard to the location and construction of airports that the representatives of the Bureau of Aeronautics, Department of Commerce, have been kept busy visiting communities in response to these requests.

Toledo, Ohio, is now assured of an adequate airport located south of the city. The first plans called for a location north of Toledo, but as the city wished to be included as a stop on the Transcontinental Airway it was necessary for the airport to be relocated so that it could be designated as a mail stop by the Post Office Department.

Canton, Ohio, has selected a site of 163 acres, located seven miles northeast of town. Governmental advice has been offered with reference to building location, installations, and lighting.

Phillipsburg, Pa., has several sites proposed for an airport, but the representative of the Department of Commerce has asked for a topographical survey of one of them which is believed to offer the fewest disadvantages. Sites, even with limited runways, are quite scarce in this mountainous district. The tentative site is believed to be such that 200 foot runways about 2,000 feet in length can be constructed.

Oil City, Pa., has selected a field measuring 2,200 feet by 1,400 feet which is well located beside a concrete highway with electric power available. Department experts have recommended the removal of certain obstructions and given advice on general layout. A field in this section of the

(Continued on page 62)

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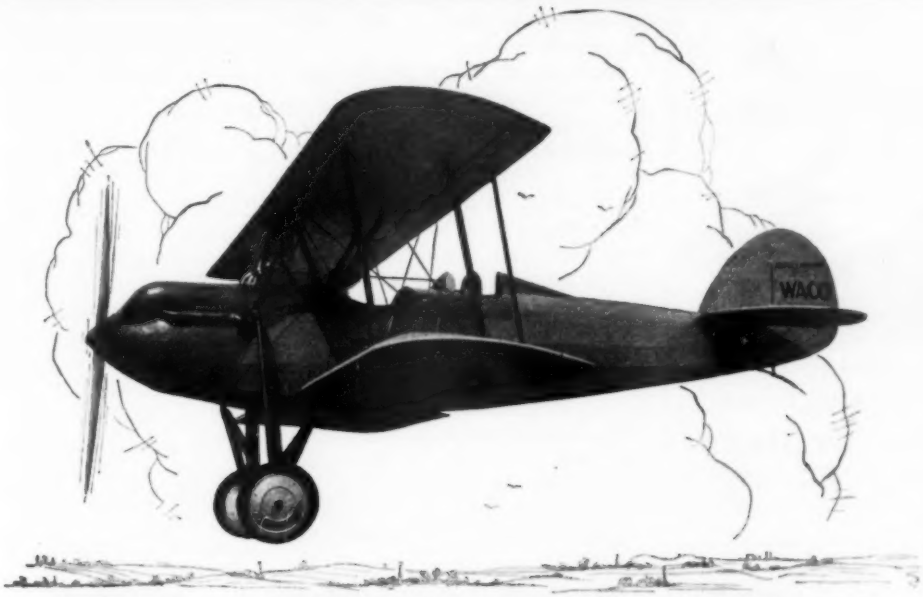

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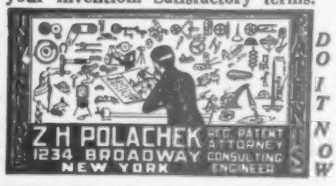

DO IT NOW

Alleghany Mountains is needed for the increase in safety of flight in this part of the country.

Bradford, Pa., has experienced a great deal of difficulty in the selection of a suitable site for a field. The present plans include the leveling of an old railroad bed, moving a telegraph line and a number of buildings. Trees must be cut down and an oil well pump torn down. When completed the field will afford two runways of 2,200 and 2,500 feet in length. Valley fogs are not uncommon at Bradford so the city plans an emergency field on top of one of the surrounding mountains. This field will have a landing strip 400 feet by 2,000 feet, for use when the city field is obscured by fog.

Madison, Wis., now has a rotating beacon and ten 500-watt flood landing lights.

The beacon at Sandy Valley, Pa., C-NY-14B, has been relocated an eighth of a mile north of Reynoldsville, Pa.

The Corsica beacon, C-NY-12A, has been relocated within the town limits of Corsica, Pa.

The Florida Power & Light Co., Ft. Lauderdale, Fla., has placed in commission, on the roof of their building, an 8,000,000 c.p., 24-inch, 6 r.p.m., rotating beacon, with a beam elevation of 15 degrees above the horizon. This light has been certified by the Department and will be operated by the company from sunset to sunrise. Its location is lat. 26° 04′, long. 80° 12′.

The Portsmouth Savings & Loan Co., Portsmouth, Ohio, have located, on a 30-foot tower on the roof of their building, a 2,000,000 c.p., 24-inch beacon, rotating at one revolution per 100 seconds. This beacon has been certified by the department and is located at lat. 38° 44′, long. 82° 59′. It will be operated by the company from sunset to sunrise.

The Portland Gas Light Company's gas holder at Portland, Maine, is now marked with "Portland" and an arrow pointing to the airport.

"Visalia Airport Five Miles" with an arrow covers the roofs of buildings in two blocks in the center of Visalia, Cal.

At Norwalk, Conn., the name "Norwalk" appears on the roof of the Barker Motor Company building and also on the roof of the plant of J. & J. Cash Company.

The Standard Oil Building in the northern part of Colton, Cal., is marked on the roof with "Colton" and an arrow pointing north.

News of the Airways

On the Atlanta-New York Airway the surveys have been completed and the installation of airway lights and intermediate fields is now in progress on the sections between New York and Richmond, and Greensboro and Atlanta. The contracts for the remaining section between Richmond and Greensboro will be let shortly.

This airway, which will be one of the most important in the United States, is 736 miles long and serves the industrial cities of Atlanta, Spartanburg, Greensboro, Richmond, Baltimore, Philadelphia, Washington and New York City. It will be lighted by 80 powerful rotating airway beacons and will be served by 30 intermediate flying fields lighted for night flying.

Night air mail service will be started on the first of March, 1928, by Pitcairn Aviation, Inc., operating under a schedule which shows departures from New York and Atlanta at 9 p. m. daily.

Landing fields were scarce along this route and many difficulties were encountered by the survey men, which necessitated the delay in opening the air mail service. There has been no lack of co-operation by the municipalities along the route, and many intermediate fields have been turned over to the Department of Commerce in complete shape.

The survey work on the Salt Lake City-Pasco Airway is complete. The lighting has been extended 130 miles. It was originally intended to light only the section from Boise to Pasco, but lighting arrangements have been made from Boise as far south as Burley, Idaho. From Burley southward the day fields are located at Idahome and Strevell, Idaho, and an additional site thirty miles south of Strevell on the shore of the Great Salt Lake.

The tentative route for the Louisville-Cleveland Airways extends from Cincinati via Middletown to Dayton, then by way of Springfield and West Jefferson to Columbus, Mount Vernon, Wooster, Akron and Cleveland. The balance of the survey will be completed shortly.

On the Transcontinental Airway an

(*Continued on page 64*)

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Aviation Schools

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effort is being made to install lights between Colfax, Cal., and Reno, Nev., before the cold weather makes work in the moutains impossible. This route follows in a general way the Southern Pacific Railroad and in many localities the pilots are forced to fly through rather narrow canyons, owing to severe fog and cloud conditions overhead. The Department plans to install 275 M/M acetylene lights at a close spacing of from three to five miles along difficult portions.

Flying Under Difficulties

A recent government bulletin quotes from the report of Airways Extension Superintendent Lucas on the section of the Los Angeles-Seattle Airways between Grant's Pass and Roseburg, Oregon. This is a mountainous district and it is difficult to locate landing field sites, as can be seen from the report. Prairie flyers will get a new idea of what is being done in some sections of the country when they read:

"It has been rainy and foggy here at Grant's Pass much of the time during the past week, which has given me an opportunity to study the conditions which exist during the winter months at Grave Creek, Wolf Creek and Cow Creek Canyon, when the low hanging clouds shut off the tops of the mountain ridges from view, leaving only here and there a gap at the lower places. The ground fog rising up from the timber covered mountain sides obscures much of the mountain sides below the cloud ceiling and sometimes closing the gaps in the ridge line left open by the clouds. In many places the fog can be seen rising up to amalgamate with the clouds.

"Sometimes a mountain pass is visible below the cloud line and above the ground fog banks, and then in twenty minutes the clouds have settled or the fog drifted or raised and closed off the pass from view. It is these conditions, not distance, which make it essential to safety that we prepare a landing field at Grave Creek, Wolf Creek, or Cow Creek Canyons. When the passes close up on both sides of a canyon and if there is a plane in the canyon, it becomes bottled up and needs a place to land and wait for the pass to clear.

"Between Grant's Pass and Roseburg are four of these ridges which have to be hurdled between tree-tops and cloud line with only a thin gap between. Oftentimes the cloud line has settled down into the trees of the pass. The pilot shoots up into the clouds when nearly to the pass and flies blind while he counts five or ten and then cuts the gun and lets the plane settle in the canyon beyond, "trusting to God and a few Marines" that the canyon has a ceiling.

"If the pass is obscured to such an extent that to attempt to hurdle it blind in a fog or cloud would be almost certain disaster, then he needs a place to land and wait. Sometimes a pass will clear for fifteen or twenty minutes and then close again. For that reason it is important to have the landing field where one can wait on the field and watch the pass.

"Then as soon as it clears he can hop through to the next canyon. If he can get no further he lands in that canyon and waits for the pass to clear, then hop through and continue, though the pass may close behind him five minutes after he has hopped through."

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Richmond Aero Club

The Aero Club of Richmond, Port Richmond, Staten Island, New York, has been formed and officers have been elected. The club has received a charter from the A. S. P. A. and it is expected that the quota of 150 members will be filled by February.

Lieut. B. Perricone, Q. M. Res., is president of the club, and Sergt. V. Klemmer, N. Y. N. G., is vice president. The other officers are Anthony Bitetti, secretary, and Sergt. G. Hamilton, N. Y. N. G., treasurer. Lieut. J. A. Battel, of the Aviation Squadron, New York National Guard, has been chosen as pilot instructor, and with him are associated Sergt. Hamilton and L. Mamlock, who will act as instructors.

Arrangements have been completed so that motor instruction starts immediately, the club having purchased a used motor for instruction use. For the present the members are renting a Standard for flying and instruction, pending the delivery of the plane which the club will purchase.

The Bronx Aero Club

With a rapidity that has amazed even its most sanguine boosters, The Bronx Aero Club, under the guidance of The American Society for Promotion of Aviation, has grown to a membership of 150 paid up members. The books of the Club have been closed temporarily against new memberships, until such time as a new adjustment of initiation fee and dues shall be made.

An election of officers resulted in the election of Major William F. Deegan, prominent in political, business and social activities of the Bronx, as President of the new club. Stress of business has recently forced the resignation of Major Deegan, and the position of President was filled by Lieut. John E. Heywang, former U. S. Marine Corps flyer and at present engaged in commercial air activities. Lieut. A. E. Flood, Air Service Reserve, and assistant principal of a local school is Vice President Lt. Ben Berkowitz, Air Service Reserve, and a prominent Bronx realtor, is Treasurer. Mr. Jacob Patent, a club worker of the district, was elected Secretary. Mr. Harry Wall, Jr., formerly in charge of the field at Casaux, France, and Capt. Eddie Rickenbacker's chief mechanic at the front, holds the position of financial secretary. Mr. Shirley Braithwaite, civilian pilot, is recording secretary.

Miss Catherine Acker, recent winner of the Bronx Beauty Contest, has the honor of being the first woman member of the club and is taking active instruction in piloting, under the tutelage of Lieut. John E. Heywang. About twenty women members of the Club are active in the work of the organization, and have formed their own flight.

Thirty-five members recently visited the Barrett Airways at Armonk, N. Y., where a special rate was established for those taking flights. Two weeks ago 200 persons representing Bronx Aero Club members and friends, visited the Guggenheim School of Aeronautics and were shown through the institution and given instruction by Lt. Hopkins, U. S. A. S. in charge.

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Chanute Aero Club

One of the thriving clubs of the Middle West is the Chanute Aero Club of Chanute, Kansas. Formed early in 1927 by seven men who were anxious to promote aviation, it soon reached a membership of thirty-five, including local business men and other air enthusiasts.

The officers of the club are the seven charter members, and consist of O. E. Dickerhoof, president; Palmer Forslund, vice-president; Nubs White, secretary; Loren Carlburg, advertising manager; Ray Richmond and Ray Barker, field managers; Noel Owens, assistant advertising manager, and Aubrey M. Barnes, field superintendent.

The Chanute Chamber of Commerce leased a quarter section tract for the airport and markers, gas pump and hangar have been installed. The field is a four-way field and was formally dedicated by Col. Charles A. Lindbergh on August 18, 1927. It is marked with an eighty-foot circle and white flags. The club maintains a club room that is open to visiting pilots at all times.

Four planes use the field and storage facilities at the present time, and the usual activities are going on at all times, including passenger work, air advertising, cross country flights and student training.

Interest in aviation has increased to such an extent that a local firm has taken the agency for a well known plane and reports a large number of live prospects.

Seaplane Cruising Radius

Construction at the Naval Aircraft Factory at Philadelphia of a new type of flying boat with a cruising radius of approximately 3,000 miles, is viewed by naval aviation officials as a distinct achievement in naval aviation. The plane, known as the PN-11, is built along the general lines of the other PN planes now in service, and does not differ widely from that used by the late Commander John Rodgers in his attempted trans-Pacific flight, but several innovations have been incorporated in its design.

The Navy already has called for bids from commercial companies for the construction of 25 of the PN-11 type.

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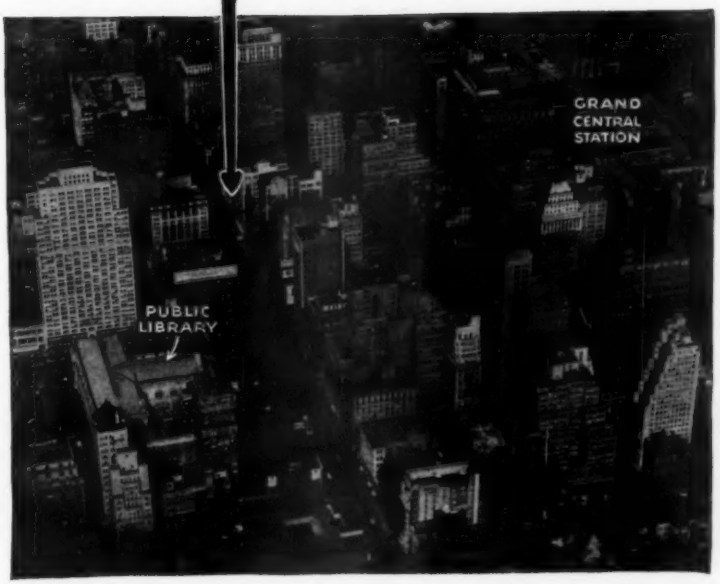

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The Caterpillar Club

(*Continued from page* 21)

"I happened to look down when the chute opened and the plane was almost directly under me, in the same position as when I started my jump It hardly seemed possible that the plane should be under me when the chute opened. However, it will give you an idea of the speed at which it was traveling.

"The sensation then was pleasing. I felt like a king with the whole world at my feet, though I thought, too, of all other pilots who had jumped and the possible things that could happen.

Lieutenant Bertrandias maneuevred his parachute to avoid high tension wires, hit the ground on a run and fell on his face, little the worse for the experience.

Second Lieutenant Will W. White jumped at Kelly Field, June 6, 1924, when two planes collided, but Lieutenant S. L. Thompson failed to jump in time and was killed.

Lieutenant White said that it seemed "the most natural, simple thing in the world to step out and pull the cord" and that he did not remember any debate or anxiety as he left the ship. It was not until after he had landed in a newly cultivated cotton field that the realization of his escape and Lieutenant Thompson's misfortune seemed to hit him all at once, and he sat down "too scared and weak, I guess, to stand."

Second Lieutenant Alder R. Crawford tumbled over and over several times after diving head first out of his plane before he remembered to pull the cord of his parachute. He wondered if the air pressure would be so great that he could not move his arms, but "quite naturally there was no difficulty in this respect."

"As soon as the rudder broke there was only one thing to do and that was to leave the ship," wrote Captain William E. Lynd on his jump at Kelly Field in November, 1924. "This I did by simply releasing my safety belt. I did not climb out nor do I remember jumping out. I merely released the catch on my belt and just left the ship and never touched any part of it thereafter."

His first thought was to get his parachute open.

"I had great difficulty in locating

(*Continued on next page*)

The Club Roster

Here is the membership roster of the Caterpillar Club. Army officers who keep the records are not certain that they have all who are eligible and they would be glad to receive information about any others who may have saved their lives by use of the parachute. The records are kept by Lieut. J. E. Upton, Army Air Corps, Washington, D. C.

Date	Name	Rank	Place
	1920		
Aug. 24	William O'Connor	Civilian	McCook Field
	1922		
Oct. 20	Harold R. Harris	1st Lieut. army	McCook Field
Nov. 11	Frank B. Tyndall	1st Lieut. army	Seattle, Wash.
	1924		
April 24	Mr. Bottomfield	Civilian	Kelly Field
May 13	E. H. Barksdale*	1st Lieut. army	Fairfield, O.
June 5	W. W. White	2nd Lieut. army	Kelly Field
June 13	Walter Lees	Lieut. army	Dayton, O.
June 18	John H. Macready	1st Lieut. army	Dayton, O.
July 11	A. R. Crawford	2nd Lieut. army	Kelly Field
Aug. 29	W. E. Coggin	Private army	Bolling Field
Aug. 29	L. L. Koontz	1st Lieut. army	Bolling Field
Oct. 16	W. M. Coles	Gunner navy	Coronado, Calif.
Nov. 44	W. E. Lynd	Captain army	Kelly Field
	1925		
March 6	C. D. McAllister	2nd Lieut. army	Kelly Field
March 6	Charles A. Lindbergh	2nd Lieut. army	Kelly Field
March 20	Frank O'D. Hunter	1st Lieut. army	Dayton, O.
April 6	L. E. Mix	Sgt. marine corps	Quantico, Va.
April 10	J. Thad Johnson*	1st Lieut. army	Eaglesmere, Pa.
June 2	Charles A. Lindbergh	2nd Lieut. army	St. Louis
July	Mrs. Irene McFarland	Civilian	Cincinnati
Aug. 17	K. J. Gregg	2nd Lieut. army	Lavernia, Tex.
Oct. 1	F. O. Rodgers	Lieut. marine corps	Langley Field
Oct. 10	Fred C. Nelson	2nd Lieut. army	St. Louis
Nov. 11	Leonard S. Flo	2nd Lieut. army	Wright Field
Nov. 11	John McGlynn	Private army	Wright Field
	1926		
March 5	Frank O'D. Hunter	1st Lieut. army	Selfridge Field
March 24	E. H. Barksdale	1st Lieut. army	McCook Field
May 10	Horace M. Hickam	Major army	Langley Field
May 10	Harold Gieger*	Major army	Langley Field
June 2	S. E. Ingersoll	Lieut. navy	Pensacola, Fla.
June 17	J. T. Hutchinson	1st Lieut. army	McCook Field
June 17	Paul Stanley	Civilian	McCook Field
July 5	Walter M. Williams	Captain army	Nashville, Tenn.
July 5	John W. MacKenzie*	2nd Lieut. army	Nashville, Tenn.
July 24	Victor E. Bertrandias	1st Lieut. army	Baltimore, Md.
Aug. 8	John I. Moore	1st Lieut. army	Austin, Tex.
Sept. 16	Charles A. Lindbergh	Air mail	Ottawa, Ill.
Sept. 17	C. L. Williams*	1st Lieut. army	Hawaii
Nov. 3	Charles A. Lindbergh	Air Mail	Covell, Ill.
Nov. 12	Charles E. Widmer	Air Mail	Hollywood, Calif.
Nov. 23	Warren D. Williams	Air Mail	Bowling Green, O.
	1927		
Jan. 18	Roderic M. Krider	Cadet army	Kelly Field
Jan. 18	George T. Shlepper	Cadet army	Kelly Field
Feb. 3	Lawrence C. Craigie	1st Lieut. army	Brooks Field
Feb. 3	Fabian L. Pratt	Captain army	Brooks Field
Feb. 15	Carl G. Ashley	Private army	Galveston
Feb. 27	Herbert A. Dargue	Major army	Buenos Aires
Feb. 27	Ennis C. Whitehead	1st Lieut. army	Buenos Aires

(*Continued on next page*)

the release ring," he recalled, "and after making several frantic grasps where I thought it should be, I took hold of the strap over my left shoulder and slid my hand down the strap until I came to the ring."

Four men gained membership in the club last May 28 when they jumped from the same plane near Reynoldsburgh, Ohio, though a fifth man, apparently wounded by a blow from a piece of the engine, failed to jump and was killed. The four were Major Lewis H. Brereton, Lieutenant B. M. Bridget, Master Sergeant Clyde M. Taylor, and Staff Sergeant Fred P. Miller.

Miller, who was working the radio set, forgot, in his anxiety to jump, that the headpiece of the set was securely fastened to his head with the other end of the wire fast to the set and to the plane. He was stopped by the tether just before he jumped and managed to get the headpiece off.

Major H. Gieger, who jumped May 10, 1926, when his plane collided with the plane of Major Horace M. Hickam, and who subsequently was killed, reported that he went through the motions automatically and that it was not until his parachute opened that he could analyze what had taken place.

Major Gieger's jump convinced him that the story, so often advanced, that it requires an abnormal degree of cool nerves and self possession to make an emergency parachute jump, is hardly exaggerated.

"I believe," he said, "that any person with sufficient altitude and experience who is familiar with the operations of the parachute, will, provided he is in normal physical condition, perform the operations necessary to a safe jump without conscious effort to analyze his situation or to plan out each operation involved. It would seem from my experience that under such conditions the brain will function properly, instantly and independent of any attempt to reason or make decisions. The factors of cool nerves and self possession do not, therefore, apply in such conditions. There is not sufficient time to exercise these faculties and the normal brain will work without them."

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The Club Roster

April 15	Stephen A. McClellan	Lieut. marine corps	Anacostia, D. C.
April 27	Stewart W. Towle, Jr.	2nd Lieut. army	Champaign, Ill.
May 4	Hawthorne C. Gray	Captain army	Chanute Field
May 13	George C. Finch	Lieut. army	Edwards, Mass.
May 28	Lewis H. Brereton	Major army	Reynoldsburg, O.
May 28	B. M. Bridget	Lieut. army	Reynoldsburg, O.
May 28	Clyde M. Taylor	Master Sgt. army	Reynoldsburg, O.
May 28	Fred P. Miller	Staff Sgt. army	Reynoldsburg, O.
June 20	Eldo Peterman	1st Lieut. army	Los Angeles
June 20	H. J. Cooper	1st Lieut. army	Los Angeles
July 12	C. B. Whitney	1st Lieut. army	Woodward Field
July 12	P. L. Woodruff	Staff Sgt. army	Woodward Field
July 18	B. W. Craycraft	R. O. T. C. student	Chanute Field

* Subsequently deceased.

Members of the regular army, reserve corps and national guard are included under the army.

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Free Lancing in the Air

(*Continued from page 15*)

take-off we had only to descend five hundred feet to land.

Our first trip from Dease Lake was down the Dease River as far as McDames, where there is a Hudson Bay post and a couple of mining companies are engaged in dredging operations. This distance of ninety miles took up just fifty minutes. We found it quite impossible to convince the Indians of this as it took them one week to make the return trip. They plainly regarded the machine as something diabolical and could not be induced to approach closer than three hundred yards, while they seemed to believe there was something supernatural about us. "It flies like a duck and lands like a goose," one observing Indian put it. It was the sole topic of the tribes and fresh Indians came in from miles every day to view it. The younger set for long periods sedulously practiced the roar of the engine and with their arms imitated the movements of the plane in turning and banking, evidently so as to be able to take back an accurate and convincing story to their brethren in the bush.

While at McDames we chartered a large scow capable of carrying five tons of supplies and had the Indians bring it up to the head of Dease Lake, where it was loaded with gasoline, supplies, and equipment and sent down the river to Liard Post, located at the junction of the Dease and Liard rivers. The trip by scow took twenty days. We did it by plane in just under three hours.

Our arrival at Liard caused excitement enough, the Indians collecting on the river bank very much alarmed. One particularly wild-looking fellow immediately started in a panic for the brush, but as we circled preparing to land the shadow of our machine intercepted his flight and terrified he turned deciding the river was his safest retreat, and made for it. Just as he got to the bank, however, he realized we were landing there and frenziedly turned again and plunged terror-stricken into the bush. He lay hidden there for some while before slinking forth to secure his pail, rifle, and dog, and set about the construction of a rude raft. That evening he set out on a four hundred mile journey to Nelson to tell the big chief of the fearsome thing which had arrived. I still wonder what happened to him.

While the scow was en route we transported the prospectors by air to various locations. Considering all conditions and the difficulties a forced landing would have put us in it was not the safest kind of flying.

The scow eventually arrived on July 11th and the two redmen who had brought it down intended returning on foot, a matter of five days and nights travel. As we were going back to Dease Lake and had to pass the Indian camp we invited them to go along. At first they would not consider it at all and so strong was their reluctance and so amusing to us the attitude of these two Indians who had piloted the clumsy scow down all manner of rough water that we decided to persuade them to fly if we could. It was hard work. "No, me weak heart. You big man. You strong heart." We at length managed to overcome this objection, then it was "Me got dogs. No can take the air." "Sure we can take them," I said, and with excuses running out they began to look shamefaced, and we summarily bundled them into the plane.

We had seated them and got as far as putting helmets on their heads and cotton wool in their ears when the nose of one of the two began to bleed profusely. This was regarded as a very bad omen indeed and the trip was nearly off. However, more persuasive eloquence and copious cold water poured down the back of the neck

Indian Family—They still believe in evil spirits and witches.

stopped the bleeding, and losing no more time we took off.

These two Indians would have thought nothing of running rapids with a few poles lashed together with moose hide strings, but the plane plainly had them terror-stricken. As soon as we left the water their heads disappeared beneath the cockpit and did not show again until after we had landed fifty minutes later. It would have taken them five days to cover the distance on foot. I will never forget their expressions as they tried to realize the distance they had come. Yet greater, if possible, was the wonder and bewilderment of their friends who had congregated upon the bank to see the big bird land as they saw two of their own people emerge from the bowels of the monster. I am sure they would be made chiefs or killed as wizards.

On the evening of July 5th we picked up the prospectors at French Creek, which runs into Dease River some forty-five miles from Liard Post, and flew them to Liard. As the machine approached this post for the first time the whole population, Hudson's Bay factor and Indians gathered on the river bank trying to solve the strange noise. Finally they spotted the big bird coming straight for them a couple of thousand feet in the air. The Hudson's Bay man, so we discovered later, thinking the machine was going to pass and get lost, instructed the natives to get their guns and fire a fusillade, imagining that the reports would be heard by us. We knew nothing about this, but a few hours after landing discovered considerable water in the hull of the machine, and on investigation found a fountain shooting up at the bottom just at the rear of the gas tanks. The fact that the hole was clean, and most suggestively about the size of a 30-30 bullet, caused us to make inquiries and we were informed about the shooting. Little damage was done though it is difficult to say what might have happened had the gas tanks been pierced.

When camp was established here at Liard Post exploration work was carried out in many sections and the prospectors were amazed and gratified at the marvellous manner in which aerial transport speeded up exploration work. On one occasion in one day we transported seven men, with sufficient supplies to last a month, including tents and mining equipment, a distance of two hundred miles over country quite unmarked by trails and without any sign of human habitation. The first men were landed at this point and after cooking breakfast were actually working a couple of miles up the creek by 8:30 a. m. When the operation was completed the whole party was returned to the main base in one day. Any other means of transportation, if not altogether impossible, would have taken at least a year.

On the evening of August 17th we departed from the head of Dease Lake and flew to Frances Lake, a distance of three hundred and ten miles, and about one hundred and thirty miles north of the Yukon-British Columbia boundary. There was no sign of human life, white or Indian, here at all, though at the old abandoned Hudson Bay fort there were several deserted log cabins and a few old caches. My outstanding recollection of that night is of the wolves. They seemed to be everywhere and kept up an incessant howling all night. We did not see them but their unquestionable presence in such numbers was uncomfortable.

The game of that sparsely inhabited country is unbelievable. The lakes and rivers teem with the finest fish which in addition to being an important article of our diet furnished us with superb sport. Flying over the country it was a common sight to see moose, sometimes as many as a dozen at a time, standing at the shore line of small lakes. Sailing along close to the high-rigged mountains caribou, goat, grizzly bear and other animals could be seen at almost any time. Sometime it will be a wonderful sporting country. On one occasion I saw a pure white moose. Another time when I was fishing I saw a big moose and called to Col. Williams to come and see it as he was casting further up stream. As he did not come immediately I went to see why and discovered he had been intercepted by a bear with two cubs which he was busily bluffing. Luckily his bluff wasn't called.

The last place we visited before coming out was the fabled "Tropical Valley," colored and exaggerated press accounts of which have been so sceptically received. We heard vague accounts of the valley while at Liard Post, based mainly upon the meagre information of Indians, and also about a prospector and trapper, Tom Smith, and his daughter who had wandered overland from the Yukon, had gone into that region two years before and

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"The wildest Indian I ever met."

had not been seen or heard from since. We decided to make a trip to see if the valley really existed and if possible get trace of the missing pair.

We knew that the mysterious region was approximately two hundred miles from the post and accordingly took off and followed the course of the river, which is punctuated with frequent terrifying rapids. We had flown what we judged to be approximately the distance when we reached a region of peculiar looking lakes. We thought them peculiar but there was perhaps nothing unusual about their aspect. They were striking to us since there were no other similar bodies in the country for some considerable distance in any direction. Deciding this must be the place we made a landing on the river and tied up. With the machine secure we started out to scout.

Almost immediately we struck a trail, faint and apparently not used for a long while, but unmistakably a trail. We followed this for about four hundred yards from the river and then surprisingly encountered a board nailed across a tree. Upon a piece of wood painted in rude characters were the words "A. B. C. Code" followed by a jumble of figures and signed Tom Smith. It baffled us for a little while but finally the combined wits of the party deciphered out the words "Message in bottle at foot of tree."

We dug at the bottom of the tree and just below the surface struck a bottle which upon opening was found to contain two sheets of paper covered with very legible handwriting. I cannot remember the exact wording of the message but it started off "To any white man finding this message" and went on to the effect that by following the trail back for two miles a cabin would be found near the first hot springs and a short distance beyond a garden "we have left planted to potatoes and onions." By further following the trail, the message continued, the finder would come to a large hot spring overlooking a meadow "in which moose are to be found every morning and evening during the summer months." The message, signed Tom Smith, concluded by saying that he and his daughter had been living there for two years and had seen no white man and were leaving for Fort Simpson which "barring trouble with the Indians we expect to reach in the spring."

We progressed up the trail, the atmosphere becoming more torrid and langorous as we advanced. Shortly we reached the first hot spring and just beyond that found the deserted cabin. A little further away was the garden, rank and overgrown. From here we started out to explore a limited area of the valley which appeared to be about ten miles square in extent.

Hot springs sprang from the ground all over. Some of them just bubbled up and ran straight away. Others formed the pools of varying dimensions we had seen from the air. The rich and luxuriant growth and foliage was distinctly suggestive of a tropical region. Ferns grew to an enormous height and size, and vines spread all ways in a tangled mesh. Berries of many kinds were growing in profusion and of an extraordinary size. Flattened patches indicated where bears came in to dine. About many of the little boiling lakes were large patches of purple violets of a size and beauty I had never before known. Much of the growth was unfamiliar to me and such as I had known in other parts of Canada of an extraordinary lavishness and production. I was brought up in Alabama and nothing has ever so reminded me of that southern state.

We stayed two days and then flew back to Liard. Later when flying out we reported what we had found to the Mounted Police at Fort Simpson. They told us the rest of the story of Tom Smith and his daughter. Coming down the river in a canoe the craft had capsized in the rapids. The girl had been taken down the river and swept up unconscious on a sandbar. When she came to her senses there was no trace of her father, an old man, to be found. She had made her way to Fort

The crash in a northern lake.

Simpson and was working for the Hudson's Bay Company.

With the summer's work completed we returned to Liard post and left there on the morning of August 28th, landing at noon of the same day at Wrangell, Alaska. From there we proceeded to our starting point, Prince Rupert in British Columbia, covering the distance of over four hundred miles in a little over four hours, arriving on August 31st. Thus was successfully terminated the first aerial mining exploration trip in the history of aeronautics, and what I think was one of the most single-handed and isolated aircraft operations ever carried out without hitch.

After a winter spent in the comfort of the city with adequate opportunity to become completely surfeited with the things of civilization I was again offered the position of airman to the sealing fleet and quite readily accepted. On March 5, 1926, I sailed out again with the fleet from St. Johns, this time with somewhat greater zest by reason of my experience the previous summer and the more valuable knowledge I felt I had acquired. Northward the sturdy little ships steamed, making a difficult and hazardous way among the ice floes, at times having to blast an ice field apart when progress was altogether barred. At such times the entire crew was landed upon the ice and at the end of a cable slowly rocked the ship through the narrow channel made. Seven days the fleet made its few miles a day northward before the look-out on our vessel, with eye glued to telescope, spied a solitary seal.

It was taken to be merely a stray animal drifted far away from the main patches. The sealer captains were of the unanimous opinion that they were yet much too far south to be in the neighborhood of seals. They were all for continuing north. It was a beautiful flying day, however, and I asked the captain to let me make a flight. To this he consented after some importuning. The ship was moved to an ice floe, and the plane landed, and after tuning up I was off. I was away only half an hour from the ship but in that time located a floe approximately thirty-two miles square with seals over its whole extent. I got back shortly after noon with this report, and the other vessels were wirelessed and by evening all had come up to the vicinity.

Killing could not lawfully commence for two days more and, as if to guard against an over anxiety to seize the prize within grasp, resulting in an infringement, a howling, blinding blizzard set up which raged unremittingly for two days and drifted the vessels with the floes some fifty miles. On the night of the second day it subsided and the dawn of the 13th broke clear. With the first streak of light showing in the sky the crew of the various vessels, numbering about one hundred and sixty men to each ship, were out upon the ice and making their way toward the seals. The work of slaughter commenced. On the crews went, collecting the skins in pans, marking them with the owner's flag, until the patch was exhausted, and a return was made to the vessel, picking up the pans en route and dragging them behind.

Under ordinary circumstances the vessels would now have had to start out roaming again among the ice floes until other patches were located, quite largely a matter of luck, and at best but a very slow and perilous process. After the success of the first

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On an unnamed lake in the barren lands of northern Alberta.

flight, however, the captain was quite prepared to let me make a second one, and on March 16th I took to the air again. On this flight I discovered very speedily a large patch of seals but a few miles away, but a good deal of very difficult ice intervening, and in half an hour was back and reporting this. My observation was valuable in pointing out the best way to get through the ice, and the vessel carrying the plane was in consequence able to reach the seals much sooner than the other vessels wirelessed.

As a matter of fact I made another flight the same day in response to a call for assistance from two vessels which, in endeavoring to come up, had become jammed in the ice and whose captains were naturally annoyed at being unable to approach the patch and share in the catch. The flight I made was responsible for putting them in touch with another large patch of seals but a few miles from them, and of which they had not the least suspicion. They proceeded to the hunt immediately and filled up as rapidly as the others.

These patches were in turn exhausted and there still being space available there was no hesitation about ordering another flight. On March 24th I went up for the fourth time and very rapidly discovered another large patch of seals and directed the vessel towards it. Days might otherwise have been spent in locating this floe if, indeed it had not been missed altogether. Working this patch filled the vessel I was on to capacity with oil and skins and we set out to return to St. Johns with what was almost the record catch for an individual vessel in the history of Newfoundland sealing. Not for many years, I discovered later, had the fleet's aggregate for 1926 been equalled.

I returned from the sealing expedition just in time to join another mining expedition instituted by an Alberta syndicate, this time into the Northwest Territories. The party consisted of five, including two mining engineers, and again I was assistant pilot and mechanic. We shipped the machine, the same Vickers Amphibian, to Edmonton and thence to Lac la Biche in Northern Alberta, where it was assembled. From Lac la Biche we flew to Fort Fitzgerald, and from there set out for a point four hundred miles northeast where we planned to establish our main base. We were unable to make this in one flight, however, and so accomplished it in stages. Two intermediate camps and caches were made, about one hundred and fifty miles apart. We stayed from a week to two weeks at each, flying the mining engineers out on various radii to make prospecting expeditions.

It was a novel enterprise and not without its hazards from a flying point of view. North of Fort Fitzgerald there was no one in the country but Indians, and had apparently been no one there for at least twenty-five years. Meat drying racks we found were at least that old. Further north we got into that region which had been aptly termed "The Blind Spot of Canada," an immense, desolate stretch of badlands, bald rolling barrens, with scrub timber periodically occurring. No maps exist of the area and we were only able to determine our position from the sun and the stars. We passed over literally hundreds of lakes and rivers that are as yet uncharted, and in flying from one cache to another these were our only guides. One had to fix the shape of certain bodies en route in the mind, and the area was singularly devoid of characteristic features, or else make one's own rude maps. This was somewhat of a strain and a worry. If the location of a cache had been missed and a forced landing to be made on account of fuel running out, that would have been a pretty predicament. It is generally believed that today it is difficult to go any place in Canada where a white man has not been before, but with the flying boat it is comparatively easy. We passed over thousands and thousands of miles of unsurveyed territory, made landings and established camps in the most absolute wilderness isolation. Had anything gone permanently wrong with

The plane ran out of gas and had to land in Cache Lake.

the plane it is quite possible that no one would ever have learned of our predicament.

Having established the main base we spent the entire summer in transporting supplies from the two caches behind us and in making radial prospecting trips, all of which we completed without mishaps of any kind. The engineers seemed to be entirely satisfied with the work and brought back heaps of ore samples. While the care of the plane and the maintenance of an adequate supply of gasoline kept us pretty busy there was time for considerable entertainment. Except for the mosquitoes, which were numerous and voracious, there was no drawback to life in this isolation, completely cut off from the rest of the world.

The resources of this country, even the tithe of them that is known, are immense. The previously unknown lakes teem with the most edible fish and will some day have a high sporting as well as commercial value. As we penetrated farther north we encountered herds of thousands of caribou, and flying at a height of two thousand feet the innumerable trails of these animals spread like a mesh over the bleak surface of the barrens. The caribou constitute the principal sustenance for the Indians and such white trappers as penetrate the area in search of furs, and the unexplained migration of these animals is disturbing.

On our way out with the summer's work completed we were forced to make a landing on a lake about one hundred miles from Fort Fitzgerald, and while here waiting for the weather to clear two Indians of the "caribou eaters" paddled out to where we were camped and inquired in part English and part French whence we had come. We replied from the barrenlands, or the Land of No Sticks, as they call it, and this amazed them. They were immediately eager to know if we had seen any caribou and when we replied in the affirmative they were greatly pleased as this meant "plenty meat" for the winter.

One of them was anxious to send a note to some friends at Fort Fitzgerald and asked if we would deliver it. We replied that we would be only too glad and he produced a notebook and with much laborious effort which brought beads of perspiration to his brow he penned a queer geometric note. After its slow completion he handed it to me with a dollar bill. I declined it and asked him how long it would take him to go to Fort Fitzgerald himself, and he replied, "Long time. Lots of portages. Mebbe one month." When I told him we could get to the fort in under an hour the pair was dumbfounded and incredulous,, one of them saying "Far, far, very far; no not far," evidently intending to convey that what was a long distance to them was little to us.

The next day we found the weather sufficiently clear to permit us to resume our way and reached Fort Fitzgerald. From there we flew to the government aerodrome at High River, Alberta, after passing over Edmonton. In all we covered about seven thousand miles without trouble or mishap. The staunch little Amphibian is hibernating while I am tasting the things of civilization again. I have a little time to reflect and certainly there seems to have been a lot crowded into the last four years. But each experience merely whets the appetite for more. Soon the spring will be round again and the Red Gods beckoning back to the romantic and adventurous life a free lance airman.

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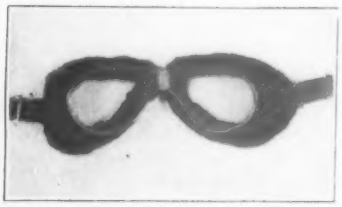

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Service Aviation—The Pioneer

By Rear Admiral William A. Moffett, U. S. N.,
Chief of the Bureau of Aeronautics

It is impossible in time of peace to maintain an air strength anywhere near that which will be required for effective operation in case of war. Realizing this point, the first concern of the Services has been to provide a source of supply, a manufacturing industry which shall be self-supporting in time of peace and which may be quickly expanded in time of war.

The development of civil aviation, which has been brought to the attention of the world during the past summer, has resulted almost entirely from experiments and construction sponsored by the Army and Navy and financed by these agencies. We have, aided by the National Advisory Committee for Aeronautics and the Bureau of Standards and other government departments, maintained laboratories and experimental activities whose output has been excelled nowhere in the world. The laboratories have been open for test of all material or equipment suggested or constructed by individuals.

The manufacture of aircraft (except for a few highly experimental designs) has been turned over to private industry and at prices designed to insure the private manufacturer a profit. Detailed design, wherever possible, has also been given to the industry in order that they might build up and maintain engineering organizations which would be available to the country at large. Airplanes have been loaned in all manner of private enterprise where they might be productive of interest or promote development in aeronautics.

Cotton dusting, control of malarial mosquitoes, surveys and maps, airways, assisting in flooded areas and many other activities have needed and received the use of service aircraft.

The aircraft engines which are being purchased at reasonable price by individuals throughout the country have been developed under the direction of and with funds supplied by the Army and Navy. The factories themselves and the engineering organizations which are maintained have been paid for from profits received for production of naval and military aircraft.

A large proportion of the airplanes which have been instrumental in forming the foundation for commercial air operations throughout the country were airplanes sold at nominal sums from surplus stock of the Army and Navy. The Post Office Department when it established the Air Mail Service was supplied with surplus war stock of these planes. Another Service contribution to commercial aviation is the pilot who has flown under all conditions, in all climates and in all kinds of weather.

Commercial aviation has been largely dependent on naval and military aeronautics and will continue to need the support of the Services for several years. It should be realized that the future of this great medium of transportation depends largely upon a continuation of the wise administrative policies which have obtained in the government departments and in the continuation of appropriations for experimental purposes.

European Skyways

European Skyways, by Lowell Thomas (Houghton-Mifflin Co.)—The dedication of European Skyways "To all who have missed the joys of flight" tells the story of this volume by Lowell Thomas. Mr. Thomas' trips covered more than 25,000 miles. Lest the reader think this is simply another volume concerning European air travel, a sort of enlargement of the class of material appearing in so many magazines of the day, we had best set him right at once.

It is not such a book, for Mr. Thomas goes back to Daedalus, and recounts the experiences of that old Athenian who flew "in gorgeous flying weather, the sort that a British pilot on the London-Paris run would call top-hole." For sheer drama we commend to you his description of some of the combats in the war. For those who love armchair travel, and for those who anticipate a similar trip, we sound a warning that this book is hard to put down. Even a tired reviewer, who is not supposed to do more than "taste" a book here and there, finds the same charm that characterized the author's "With Lawrence in Arabia."

Growth of Air Transportation in 1927

THE new air transportation industry assembled in Washington on December 5 for a conference on expansion during the coming year with a record of advancement during the past year that has not been paralleled in any industry or in any other country. Fostered by the government, but by no means subsidized as is the European industry, the American industry, in the words of William P. MacCracken, Jr., Assistant Secretary of Commerce for Aeronautics, has scrapped its inferiority complex, and is now building its future confidently and with a measure of public interest and support that could not even be imagined a year ago. Aircraft operations and activities in the United States are now on a broader scale and more diversified than in any other nation.

Air traffic operations in 1927 show an enormous increase both in number and volume of business. Regular commercial service was inaugurated during the past year over routes totaling 2,429 miles, and air transport operators now serve some 70 cities—a mileage of over 8,000. Four air transport operators under contract with the American Railway Express Company now are providing air express service on five routes with an aggregate mileage of 4,500 miles. The air mail routes, including several which will be established early in 1928, will serve 66,000,000 people in the various sections of the country along the airway.

By far the greatest volume of flying in America is done by fixed base and itinerant air operators, both individuals and firms, engaged in taxi service, crop dusting, photography, flying instruction and a variety of other pursuits, utilizing light commercial planes of both new and war-surplus material. Many enterprises are showing a profit and are extending their business with the acquisition of new equipment and the use of better airport facilities.

It is expected that the production of airplanes this year will at least double the 1926 output of 1,186 planes, and even this may be too moderate an estimate, according to the Aeronautics Branch of the Department of Commerce, which reports that the industry is far behind on orders, although it started out the year with a surplus stock. It is estimated that additional civil planes now are being placed in operation at a rate of more than 100 a month.

A large number of unexpected purchasers at this still comparatively early stage of general flight are the corporations and individual business men who have bought the most modern planes for business travel. Many airplane clubs have been formed and private flying for sport and pleasure has developed rapidly in the past twelve months. Thousands of private owners soon will fly for pleasure in up-to-date, modern, inherently stable aircraft at a reasonable cost. It is difficult to anticipate the extent to which this class of flying will grow.

"It might be said," states Clarence M. Young, Director of Aeronautics, "that the present civil demand represents but the initial production of a new industry. Civil aeronautics has, in the main, been operating on war surplus. The demand for modern planes, the diminution of war supply, and the application of Federal inspection, combined with the widespread acceptance of the airplane in business promise an increase of which any estimate must be but a guess."

The number of pilots which have been licensed to date by the Department of Commerce now exceeds 1,000. Hundreds of applications are still pending and only half the total number of airmen in the country have applied for licenses to operate planes in interstate travel.

Government participation has brought a very definite and comprehensive service to the industry, as the safe and continued development of all classes of operations depends largely on the airworthiness of the planes used, the competency of pilots, the establishment and maintenance of properly equipped airways, the enforcement of standard air traffic rules and adequate dissemination of information concerning facilities on airways and at airports.

The Air Commerce Act, approved by President Coolidge May 20, 1926, provided comprehensively for the promotion and regulation of air transportation. Air regulations were finally adopted and made effective on December 31, 1926. There was no precedent for such regulations and drafting them was a complicated problem. They

(*Continued on next page*)

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provide in detail for the inspection, registration and licensing of aircraft, the examination and licensing of pilots and mechanics, the identification of all aircraft not licensed and they set up air traffic rules.

Because of the pressure of work in examining and licensing aircraft and their personnel, the Aeronautics Branch of the Department of Commerce has been unable to keep pace this year with its work on the examination and rating of airports and landing facilities. Major Young, the Director of Aeronautics, reports that the number of these has grown beyond any reasonable anticipation and that this phase of the Commerce Department's inspection work must be given attention during the coming year.

Transport Lines Assure Safety

ACCIDENTS are rare on the air transport lines which offer regular passenger service. The Department of Commerce now is investigating all air accidents and its reports disclose that by far the largest number of casualties occur in miscellaneous flying, in which the traveling public is not primarily cencerned. During the first half of 1927 three pilots and one passenger lost their lives on the contract routes. In miscellaneous flying 15 pilots and 28 passengers were killed in 25 airplane accidents. These accidents occurred in the course of "taxi" service and pleasure rides, test flights and instruction. Practically all these accidents happened with pilots and planes which had not been licensed by the Department of Commerce.

Measures taken by the Government to safeguard flying are expected by the Department of Commerce practically to eliminate accidents in scheduled flying and also to reduce the casualty rate in miscellaneous flying.

There are more accidents in military than in commercial aviation but Major General Mason M. Patrick, chief of the Army Air Corps, points out that there is a wide difference between these two classes of flying and also between commercial and military types of planes.

"In commercial flying it must be remembered," says General Patrick, "that the pilot's mission consists in flying passengers, mail or express, over a given route, thoroughly known, well marked and with various aids to navigation to render his task comparatively easy. The Army pilot, on the other hand, must be proficient in the maneuvers which he may have to employ in battle and even in peace time must fly over unfamiliar routes.

"The popular belief that 'more flying, more accidents,' does not seem to hold good," says General Patrick. "In 1919 there was one fatal accident in the Army Air Corps for every 1,025 hours actually flown. In 1926 a total of 5,820 hours was flown for each fatal accident, and yet in 1926 nearly twice as many hours were flown as in 1919 when there were nearly four times as many accidents."

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(Continued from Page 34)

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In view of the foregoing it can be readily seen that full and complete information should be submitted whenever rates for Aviation Insurance are desired. The underwriters will thus be enabled to allow the maximum amount of credit and quote the lowest rates possible.

Raido on Mailwings

Three of the eight Pitcairn Mailwings, PA-5 with Wright Whirlwind motors, recently turned out at the Pitcairn factory at Bryn Athyn, Pa., for use in the New York to Atlanta air mail service, are being equipped with radio sets.

Dr. Pratt, of the Bureau of Standards, Washington, D. C., is working on the construction of the sets, to be installed in Pitcairn Mailwings operating over the New York-Richmond section of the route. If the use of radio proves practical over that section, the other five planes to be used in the service also will be equipped with radio sets.

The New York-Atlanta service was to have been inaugurated November 1, but the Department of Commerce's inability to complete its installation of lights along the route has forced its postponement until next year. According to W. Lawrence LePage, assistant manager of Pitcairn Aviation, Inc., the new service probably will not be started until March 1.

"We decided to install radio sets in the three planes to be used over the New York-Richmond section," said Mr. LePage, "because there is a radio beacon at Hadley Field, New Brunswick, the northern terminus of the route, and another at College Park, Md., operated for experimental purposes by the Bureau of Standards. Pilots flying over that section of the route will have the advantage of radio guidance. In the not distant future, the radio beacon and other radio service will be available over all the air routes of the country."

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Control of Air Transportation

By Rowland W. Fixel

THE extensive use of aircraft in this country and abroad has made its operation subject to stringent regulations. These have become necessary, in part, for the following reasons: Aircraft is unique in that in its present stage of development it is a potential source of trespass to private property, as it cannot be kept under absolute control. This danger is accentuated by a pilot's lack of vision in fog or in other conditions of low visibility. Furthermore, the operation of aircraft requires intensive training, adaptability, and a physical and psychological make-up suitable to the special class of work engaged in, all of which makes necessary, careful regulation and selection of those who are authorized to pilot aircraft. Again, aircraft passes through space on airways (designated paths in the air at certain altitudes between airports), and there is always the danger of approaching, intercepting or crossing the path of other aircraft. Likewise, aircraft, in order to remain in the air, must proceed at great speed, and this also forms an additional factor of danger.

The foregoing are some of the things which necessitated a code of law to define the rights and liabilities of those who own, operate or use aircraft.

This law of aviation took form first in municipal regulations and state statutes. International conferences followed and then came the convention for the regulation of aerial navigation in 1919, which has been adhered to by most of the large European countries. In the United States, the Federal Air Act of 1926, coupled with the air commerce regulations, form the basic law of the land with respect to aviation. It is true that Congress only legislated on matters pertaining to interstate traffic and it is likewise true that many of the states seek to retain jurisdiction over matters they claim are purely intrastate. But it is my belief that Congress eventually will have to take entire control of all matters pertaining to the operation of aircraft in the United States, because a division of control would injuriously react on the further development of the industry and the art. There must be central control of aviation due to (a) the possibilities of so-called intrastate aerial navigation interfering with nationally controlled aviation; (b) the inability to determine boundary lines in the air; (c) the necessity for control of entry of foreign aircraft by the Federal Governments; (d) the international character of aviation; (e) the ease of bootlegging aliens into the country; (f) the necessity for uniform registration, inspecting and licensing as a protection to the public using aircraft. In fact, all interference by the state should be eliminated, except such as is associated with police powers over landing fields and purely local aspects of the art or industry.

The law of aviation will develop and grow with the increased use of aircraft. Matters pertaining to customs, ports of entry, traffic rates, altitudes of flight, control of flight, safety devices, inspections and registrations will more and more come under rules of law, which in turn will render aviation safe, sure and dependable.

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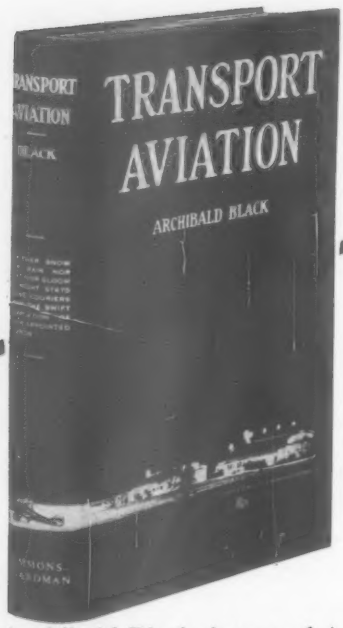

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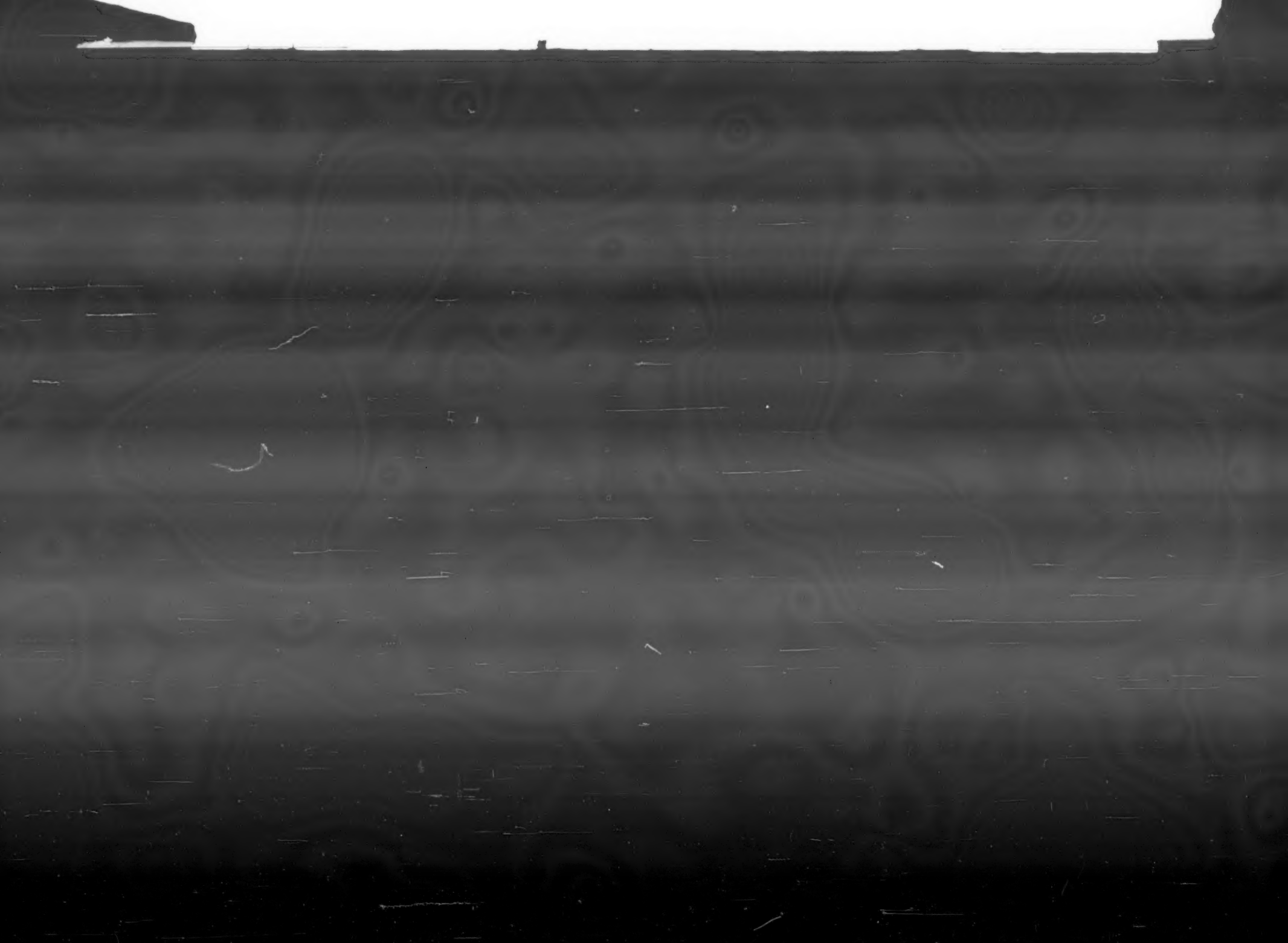

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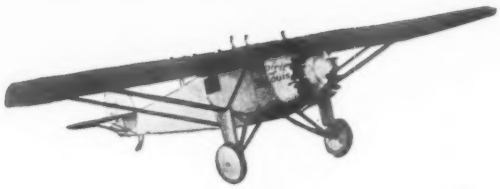

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